

## **REMARKS**

### **A. Status of the Claims**

Claims 1-12 were examined and rejected. Claims 1, 5 and 9 have been amended to improve the readability of those claims, and not for any reason related to patentability. The previous claim phrase “and that is not removable” has been replaced with “non-removable.” The scope of the amended claims has not changed. No claims have been cancelled. Claims 1-12 are, therefore, still pending. A copy of the pending claims, with the present amendments in accepted form, is attached as Appendix A.

### **B. Amendments to the Drawings and Specification**

A Replacement Sheet containing revised FIG. 1, which now shows a retainer ring in a groove in the retainer segments and the approved re-labeling of certain elements, is submitted. Also submitted is a New Sheet containing new FIG. 6. New FIG. 6 shows the claimed retainer segments and male and female subs that are threaded onto a length of pipe. The specification has been amended to reference this new figure. No new matter has been added.

Applicant submits that these revised and new figures address the Office’s statements in the last Action concerning the drawings.

### **C. Claims 1-12 Are Patentable Over the Cited References**

The Office rejects claims 1-12 as being obvious over Applicant’s prior art figures 1 and 2 in view of U.S. Pat. No. 5,047,021 to Utterberg (“Utterberg”). Applicant respectfully traverses. Utterberg is not analogous art, and even if persons of ordinary skill did look to Utterberg, they would find that it teaches away from the claimed subject matter.

**1. Utterberg Is Not Within the Field of Applicant's Endeavor**

The determination of whether a reference is from a non-analogous art is set forth in a two-step test given in *In re Wood*, 599 F.2d 1032 (CCPA 1979) (copy provided); *see also* MPEP § 2141.01(a) at pages 2100-117 – 2100-120. In *Wood*, the court found that the first step is whether “the reference is within the field of the inventor’s endeavor.” 599 F.2d at 1036. Utterberg deals with small, plastic medical fittings known as luer locks, not pup joints or anything used in the oilfield industry. *See* Second Declaration of Paul Crawford Under 37 C.F.R. § 1.132 (“Second Crawford Decl.”) at ¶ 5. Utterberg is therefore not within Applicant’s field of endeavor.

**2. Utterberg Is Not Reasonably Pertinent to the Particular Problem with Which the Inventor Was Involved**

If the first prong of the test is not met, one must “determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.” *In re Wood*, 599 F.2d at 1036. Defining the problem correctly is an important aspect of this determination. As the Board explains:

Precise definition of the problem is important in determining whether a reference is from a nonanalogous art. Defining the problem too narrowly may result in excluding consideration of relevant prior art. By the same token, defining the problem too broadly, as done here, may result in considering prior art as “analogous” which is inconsistent with **real world considerations**.

*Ex parte Dussaud*, 7 U.S.P.Q.2d 1818, 1819 (BPAI 1988) (emphasis added; copy provided). The Federal Circuit has provided guidance about how to judge whether a reference is “reasonably pertinent” to an inventor’s problem:

A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor’s endeavor, it is one which, because of the matter with which it deals, **logically would have commended itself to an inventor's attention** in considering his problem. Thus, **the purposes of both the invention**

**and the prior art are important** in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve.

*In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992) (emphasis added; copy provided).

**a. Applicant's Problem**

The problem facing Applicant was “how to keep the retainer segments and wing nut at one end of a pup joint when the pup joint is turned vertically. Otherwise, the wing nut could slide down, thus getting out of position and/or running into and hurting the operator’s hand(s).” Second Crawford Decl. at ¶ 6; *see also* U.S. Pat. No. 5,791,693 at col. 1, lines 10-13 and 27-36.

**b. The Purpose of the Claimed Pup Joints**

Pup joints are designed to carry fluid at high pressures – on the order of 1,000 to 20,000 psi. Second Crawford Decl. at ¶ 7. They are generally made of rigid, high strength materials such as carbon steel or high-strength, low alloy steel. *Id.* They can range in size from 1 foot long (or shorter) and around 10 pounds to 40 feet long (or longer) and many hundreds of pounds. *Id.* Bore sizes for some pup joints range from 1 to 6 inches in diameter. *Id.*

Most pup joints are designed for extended use. *Id.* The claimed pup joints include one or more retainer segments and a wing nut that can be made-up and broken down several times during the pup joint’s useful life. *Id.* Once the retainer segments are removed, the wing nut can be removed as well. *Id.* The retainer segments and wing nut can then be inspected and/or replaced. *Id.*

**c. The Purpose of Utterberg’s Male Luer Locks**

Utterberg’s male luer lock fittings have a nozzle and a locking ring. Col. 1, lines 8-12. Utterberg was dealing with the problem of needing a male luer lock that had a nozzle long enough to pierce a fluid bag port when the locking ring was in a retracted position. Utterberg

was concurrently dealing with the problem of generating leverage when untwisting the locking ring to separate the nozzle from the female luer fitting. Col. 2, line 27 – col. 4, line 13. According to Utterberg, it had been difficult to achieve a suitable solution to both of these problems with a single male luer lock. Col. 4, lines 22-35.

**d. It Would Not Have Made Sense To Look to Utterberg**

In Applicant’s opinion, “one of ordinary skill in my art who was faced with my problem and aware of the facts . . . about pup joints would not have considered Utterberg’s male luer locks to be pertinent.” Second Crawford Decl. at ¶ 10. The reasons for this are clear.

**i. Very Different Materials; Very Different Purposes**

The materials from which the two different structures are made, and the manner in which the different structures are used, are very different. *Id.* at ¶ 11. Pup joints are made from high-strength, rigid materials. *Id.* They are intended to be broken down and made-up several times during their useful life. *Id.* As a result, the claimed pup joints use retainer segments. *Id.*

In contrast, Utterberg’s male luer locks are made from flexible plastic, and they are likely disposable. *Id.* at ¶¶ 9, 11. No retainer segments are used or needed. *Id.* at ¶ 11. Ring 320 of Utterberg’s male luer locks can be press fit over ridge 308. *Id.* at ¶¶ 9, 11. That is not possible with the claimed pup joints. *Id.* at ¶ 11. There is no need to try and pull ring 320 off of nozzle 300 after the luer lock has been used because the luer lock can be discarded. *Id.* at ¶¶ 9, 11. It is not clear that it would be feasible to pull the ring off, even if that were desired. *Id.* at ¶ 11.

**ii. Very Different Sizes**

Pup joints are much larger than Utterberg’s male luer locks. *Id.* at ¶ 12. While a small pup joint might only be a foot long, it can still weigh about 10 pounds. *Id.* Larger pup joints can be 40 feet long and weigh hundreds of pounds. *Id.* In contrast, Utterberg’s male luer locks are

only a few centimeters long (see FIGS. 6 and 7; col. 6, lines 21-31), and have very little mass. *Id.*

Pup joints also handle fluids traveling at much greater volumes and pressures than fluids that travel through Utterberg's male luer locks. Second Crawford Decl. at ¶ 13. Bore sizes for some pup joints range from 1 to 6 inches in diameter. *Id.* at ¶ 7. Pup joints can carry fluids at pressures ranging from 1,000 to 20,000 psi. *Id.* In contrast, the passageway through nozzle 300 of Utterberg's male luer locks is only a few *millimeters* in diameter. *Id.* at ¶ 9.

The type and number of differences between the subject matter of the problem facing Applicant (pup joints with one or more retainer segments) and the subject matter of Utterberg (small medical fittings) are vast. Utterberg's male luer locks do not share any of the functional or structural features of pup joints. *See In re Clay*, 966 F.2d at 660 (reversing Board's decision and noting that subject matter of nonanalogous reference "is not structurally similar to, does not operate under the same temperature and pressure as, and does not function like" applicant's invention); *see also Ex parte Dussaud*, 7 U.S.P.Q.2d at 1820 (carpet manufacturing process patent not analogous to claimed manufacture of disposable pad for a diaper); *Wang Labs., Inc. v. Toshiba Corp.*, 993 F.2d 858, 864-65 (Fed. Cir. 1993) (substantial evidence existed that patent on SIMM designed for larger, more costly industrial controller was not analogous to claimed SIMM, which was designed for personal computer) (copy enclosed). It defies common sense to reasonably expect that a person of ordinary skill in the art faced with Applicant's problem would have looked to the field of tiny, male luer lock medical fittings for a solution. *See In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992) ("We have reminded ourselves and the PTO that it is necessary to consider 'the reality of the circumstances' – in other words, **common sense** – in

deciding in which fields a person of ordinary skill would be reasonably expected to look for a solution to the problem facing the inventor.”) (citation omitted; emphasis added; copy provided).

### 3. Utterberg Teaches Away

Even if one of ordinary skill in the art were to look to Utterberg, the claimed pup joints would not be obvious because Utterberg teaches away from the combination asserted by the Office. A reference must be considered for **all** that it teaches when evaluating the issue of obviousness. *In re Fritch*, 972 F.2d 1260, 1264 (Fed. Cir. 1992). The claimed subject matter must be considered in the same way. *Gillette Co. v. S.C. Johnson & Son, Inc.*, 919 F.2d 720, 724 (Fed. Cir. 1990) (must analyze claimed invention “as a whole”). Combining Utterberg with prior art FIGS. 1 and/or 2 violates these principles.

Utterberg describes the use of a ridge 308 that “serves to restrain longitudinal forward motion of ring 320 to the nozzle” of the male luer lock medical fitting. Col. 5, lines 39-41. Ring 320 is first press fit over ridge 308 and onto nozzle 300. Then ridge 308 **directly contacts** ring 320 to create the restraint. The claimed pup joints do not, and could not, work in this manner.

It would not be practical to eliminate the claimed one or more retainer segments, and size the claimed wing nut such that its movement could be restrained by the claimed retention shoulder. *See* Second Crawford Decl. at ¶ 14. If that were done, the claimed wing nut would have to be press fit onto the claimed male sub by moving the wing nut past the claimed forward shoulder (in the direction of the female sub at the opposite end). *Id.* The force that would be required to achieve such a fit would be very high, and would most likely permanently deform the material of the wing nut, the forward shoulder, or both. *Id.* Any connection involving the compromised material of the deformed pup joint could not be trusted. *Id.*

Combining Utterberg's teachings with those of prior art FIGS. 1 and 2 would yield an inoperative device. Uterberg, therefore, teaches away from its combination with those figures. *See Tec Air, Inc. v. Denso Mfr'g Michigan Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999); *see also Micro Chemical, Inc. v. Great Plains Chemical Co.*, 103 F.3d 1538, 1546-47 (Fed. Cir. 1997) (copies enclosed).

**D. Conclusion**

Applicant respectfully submits that claims 1-12 are in condition for allowance. Should Examiner Nicholson have any questions concerning this application, he is invited to contact the undersigned attorney at (512) 536-3031.

Respectfully submitted,



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Date: May 14, 2004

**Appendix A – Pending Claims of Serial No. 10/008,106**

1. A pup joint comprising:

- a length of pipe having an outside diameter;
- a female sub connected to a first end of the length of pipe, the female sub including a conical sealing surface, an outer surface formed adjacent the conical sealing surface and external threads formed on the outer surface;
- a male sub connected to the distal end of the length of pipe, the male sub including a section having an outside diameter greater than the outside diameter of the length of pipe, the male sub also including a forward shoulder extending radially outwardly therefrom and a spherical sealing surface adjacent the forward shoulder which is adapted to mate with and seal against the conical sealing surface of another such pup joint;
- a nut having an internal surface, internal threads formed on the internal surface and a rearward shoulder extending radially inwardly from the internal surface;
- one or more retainer segments positioned between the rearward shoulder of the nut and the forward shoulder of the male sub for restricting axial movement of the nut relative to the male sub in a first direction;
- a retainer ring positioned in a corresponding groove formed in the retainer segments and having an outer diameter which is greater than the diameter of the rearward shoulder to thereby maintain the nut positioned around the retainer segments; and
- a non-removable retention shoulder extending radially outwardly from the male sub positioned rearwardly of the forward shoulder, the retention shoulder comprising an outside diameter greater than the inside diameter of the retainer segments;



whereby the retention shoulder restricts axial movement of the nut and the retainer segments relative to the male sub in a direction opposite the first direction.

2. The pup joint of claim 1, wherein the male sub and the female sub are formed integral with the length of pipe.

3. The pup joint of claim 2, wherein the length of pipe, the male sub, the female sub, and the retention shoulder are constructed of a single forging and the retention shoulder is machined into the male sub.

4. The pup joint of claim 1, wherein the male sub is threaded onto the distal end of the length of pipe, and the female sub is threaded onto the first end of the length of pipe.

5. A pup joint comprising:

a length of pipe having an outside diameter;

a female sub connected to a first end of the length of pipe, the female sub including a conical sealing surface, an outer surface formed adjacent the conical sealing surface and external threads formed on the outer surface;

a male sub connected to the distal end of the length of pipe, the male sub including a forward shoulder extending radially outwardly therefrom and a spherical sealing surface adjacent the forward shoulder which is adapted to mate with and seal against the conical sealing surface of another such pup joint;

a nut having an internal surface, internal threads formed on the internal surface and a rearward shoulder extending radially inwardly from the internal surface;

one or more retainer segments positioned between the rearward shoulder of the nut and the forward shoulder of the male sub for restricting axial movement of the nut

relative to the male sub in a first direction, the one or more retainer segments having an inside diameter greater than the outside diameter of the length of pipe; a retainer ring positioned in a corresponding groove formed in the retainer segments and having an outer diameter which is greater than the diameter of the rearward shoulder to thereby maintain the nut positioned around the retainer segments; and a non-removable retention shoulder extending radially outwardly from the male sub rearwardly of the forward shoulder, the retention shoulder comprising an outside diameter greater than the inside diameter of the retainer segments; whereby the retention shoulder restricts axial movement of the nut and the retainer segments relative to the male sub in a direction opposite the first direction.

6. The pup joint of claim 5, wherein the male sub and the female sub are formed integral with the length of pipe.

7. The pup joint of claim 6, wherein the length of pipe, the male sub, the female sub, and the retention shoulder are constructed of a single forging and the retention shoulder is machined into the male sub.

8. The pup joint of claim 5, wherein the male sub is threaded onto the distal end of the length of pipe, and the female sub is threaded onto the first end of the length of pipe.

9. A pup joint comprising:

a length of pipe having an outside diameter;

a female sub connected to a first end of the length of pipe, the female sub including a conical sealing surface, an outer surface formed adjacent the conical sealing surface and external threads formed on the outer surface;

a male sub connected to the distal end of the length of pipe, the male sub including a section having an outside diameter greater than the outside diameter of the length of pipe, the male sub also including a forward shoulder extending radially outwardly therefrom and a spherical sealing surface adjacent the forward shoulder which is adapted to mate with and seal against the conical sealing surface of another such pup joint;

a nut having an internal surface, internal threads formed on the internal surface and a rearward shoulder extending radially inwardly from the internal surface;

one or more retainer segments positioned between the rearward shoulder of the nut and the forward shoulder of the male sub for restricting axial movement of the nut relative to the male sub in a first direction;

a retainer ring positioned in a corresponding groove formed in the retainer segments and having an outer diameter which is greater than the diameter of the rearward shoulder to thereby maintain the nut positioned around the retainer segments; and

a non-removable retention shoulder extending radially outwardly from the section of the male sub, the retention shoulder positioned rearwardly of the forward shoulder, the retention shoulder comprising an outside diameter greater than the inside diameter of the retainer segments, the outside diameter of the retention shoulder also being greater than both the outside diameter of the length of pipe and the outside diameter of the section of the male sub;

whereby the retention shoulder restricts axial movement of the nut and the retainer segments relative to the male sub in a direction opposite the first direction.

10. The pup joint of claim 9, wherein the male sub and the female sub are formed integral with the length of pipe.
11. The pup joint of claim 10, wherein the length of pipe, the male sub, the female sub, and the retention shoulder are constructed of a single forging and the retention shoulder is machined into the male sub.
12. The pup joint of claim 9, wherein the male sub is threaded onto the distal end of the length of pipe, and the female sub is threaded onto the first end of the length of pipe.



LEXSEE 202 PQ 171

**IN THE MATTER OF THE APPLICATION OF EDWARD CHALMERS  
WOOD and JAMES FRANK EVERSOLE**

Appeal No. 79-517.

United States Court of Customs and Patent Appeals

*599 F.2d 1032; 1979 CCPA LEXIS 243; 202 U.S.P.Q. (BNA) 171*

June 7, 1979, Decided

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**GROUP 3600**

**PRIOR HISTORY: [\*\*1]**

Serial No. 587,599.

**LexisNexis (TM) HEADNOTES - Core Concepts:**

**COUNSEL:**

*Richard M. Beck*, attorney of record, for appellants,  
*John N. Hazelwood*, *Robert W. Mayer*, *Daniel Rubin*, of  
counsel.

*Joseph F. Nakamura* for the Commissioner of  
Patents, *Robert D. Edmonds*, of counsel.

**OPINIONBY:**

NEWMAN

**OPINION: [\*1033]**

Before MARKEY, Chief Judge, RICH, BALDWIN,  
MILLER, Associate Judges, and NEWMAN, \* Judge.

\* The Honorable Bernard Newman, United  
States Customs Court, sitting by designation.

NEWMAN, Judge.

This is an appeal from the decision of the United  
States Patent and Trademark Office (PTO) Board of  
Appeals (board) sustaining the examiner's rejection  
under 35 USC 103 of claims 36-38, entering a new  
ground of rejection under 35 USC 102 of claim 36, and  
entering a new ground of rejection under 35 USC 103 of  
claims 36

[\*1034] and 37 of application serial No. 587,599, filed June 17, 1975, for "Variable Venturi Apparatus for Mixing and Modulating Liquid Fuel and Intake Air for an Internal Combustion Engine," a continuation-in-part of application serial No. 241,755, filed April 6, 1972, application serial No. 151,373, filed June 9, 1971, and application serial No. 168,233, filed August 2, 1971, now U.S. [\*\*2] patent No. 3,741,240. We affirm.

#### Background

Appellants, Wood and Eversole, claim as their invention an improvement of the carburetor disclosed in

a commonly assigned patent to Eversole and Berriman. n1/ Both devices include a variable venturi. n2/ They differ; however, in the means used to vary the venturi. In the Eversole and Berriman carburetor (Eversole I), the venturi flow area is varied by the up and down movement of a conically shaped pintle (26a) seated in the venturi throat (28a). n3/ In the claimed invention, the venturi is varied by moving the walls defining the venturi flow area. n4/ Appellants argue that the claimed invention is superior to Eversole I because it does not contain the pintle-type

[\*1035] modulating structure and therefore eliminates the problems of centering and vacuum pull on the pintle. However, appellants have not submitted any evidence of comparative testing between the two devices.

n1/ U.S. patent No. 3,778,038, issued December 11, 1973, for "Method and Apparatus for Mixing and Modulating Liquid Fuel and Intake Air for an Internal Combustion Engine."

n2/ A venturi is a tube with a short narrow center section (throat) and widened, tapered ends: [See illustration in original.]

It is named for the Italian physicist, Giovanni B. Venturi, who discovered the phenomenon that as the velocity of the flow of fluid in the throat increases, the pressure decreases. Conventionally, automobile carburetors include a venturi in the main air passage to meter the fuel. In such a device, the pressure drop in the throat creates a pressure differential which causes the fuel to be drawn into the air passage. 2 McGraw-Hill Encyclopedia of Science & Technology, "Carburetor," McGraw-Hill Book Co., New York, New York, at 514-17 (4th ed. 1977).

n3/ [See illustration in original.]

n4/ [See illustration in original.]

Claim 36. A device for producing a uniform combustible mixture of air and minute liquid fuel droplets for delivery to an internal combustion engine including

means defining an intake air zone [82] connecting with means defining a throat zone [88] for constricting the flow of air to increase the velocity thereof,

means for introducing liquid fuel into the air before the throat zone and uniformly distributing the fuel to minutely divide and uniformly entrain the fuel as droplets in the air flowing through the throat zone,

adjustment means for adjustably varying the area of the throat zone and controlling the rate of liquid fuel introduction in correlation with operating demands imposed upon the engine for which the mixture is produced,

means defining a zone of gradually increasing cross-sectional area downstream from the throat zone [89,90] for efficiently converting a substantial portion of the kinetic energy of the

high velocity air and fuel mixture to static pressure whereby the velocity of the air and fuel mixture through the throat zone is sonic over a wide range of intake manifold conditions,

the various zone defining means being together formed of oppositely positioned members [63,64] spaced apart with walls [65,66] defining a venturi flow passage intervening therebetween and supported with their passage defining walls in a generally coextensive and angularly fixed relation to each other, and

wherein the adjustment means is operative to vary the flow area of the venturi flow passage without changing either the coextensive or angular relationship between the passage defining walls of the members.

Claim 37. A device as in claim 36 wherein the adjustment means comprises means to move at least one of the members laterally relative to both the axis of the passage and to the other of the members for operatively varying the flow area of the passage.

Claim 38. A device as in claim 36 including oppositely positioned wall means transversely movable relative to the axis of the passage intervening between the members, and the adjustment means is operative to displace the wall means toward and away from each other. [Emphasis added.] [\*\*\*]

Both the Eversole I patent and the application before us teach that maintaining the speed of the air-fuel mixture at sonic as it passes through the venturi throat over a wide range of intake manifold conditions reduces pollution from an automobile's exhaust. According to the inventors, the sonic velocity has the effect of more highly atomizing the air-fuel mixture which improves fuel utilization and thereby reduces the level of pollutants in the exhaust. Appellants offer as evidence of the nonobviousness of their invention an evaluation made by the Environmental Protection Agency (EPA) of a carburetor covered by claims 36 and 37, the Model 2 Dresserator. The EPA installed Model 2 Dresserators in a 1973 Chevrolet Monte Carlo and a 1973 Ford Capri, and found that both of the modified vehicles were capable of achieving the California 1975 interim emission standards. Further, the EPA noted that this finding was particularly significant since it was done without penalizing fuel economy and without the use of conventional emission controls such as oxidation catalysts.

The PTO made four separate rejections of the claims on appeal. Three rejections for obviousness involve a

combination [\*\*4] of the teachings of the Eversole I patent with the teachings of references disclosing conventional variable venturi carburetors, wherein the venturi is varied by moving the members which define the venturi flow area. Two of these, Bollee n5/ and the German patent, n6/ are used in a rejection of claims 36 and 37 because they show varying the venturi by lateral relative displacement of opposed venturidefining pistons. Another reference describing the S.U. Carburetor, n7/ is used in another rejection of claims 36 and 37 because it shows venturi variation by movement of a piston toward and away from a venturi-defining wall. The last two references, Shaw n8/ and Hartshorn, n9/ are used in the rejection of claims 36 and 38 because they show venturi variation by sliding a piston or plunger between and in contact with venturi-defining walls. The fourth rejection is for anticipation and is limited to claim 36. It is the board's position that claim 36 is drawn so broadly that it would cover the prior art Winfield carburetor, n10/ a barrel carburetor wherein rotation of a cylinder throttle serves as a variable venturi.

n5/ U.S. patent No. 868,251, issued October 15, 1907, for "Carburetor."

n6/ German patent to Warmekraft G.m.b.H., No. 383, 848, published October 18, 1923, for "Jet Carburetor with Variable Mixing Cross Section Acting Also as Throttle Cross Section."

n7/ Campbell, Colin, The Sports Car Engine, Its Tuning and Modification, "Variable Choke Carburetors: The S.U. Carburettor," Robert Bentley, Inc., Cambridge, Massachusetts, at 74-75 (1964).

n8/ U.S. patent No. 1,258,153, issued March 5, 1918, for "Carburetor."

n9/ U.S. patent No. 2,052,225, issued August 25, 1936, for "Carburetor."

n10/ Automobile Engines Handbook, No. 2, "Winfield Carburetor," American Technical Society, Chicago, Illinois, at 510-519 (1945). [\*\*5]

Appellants argue before us that the obviousness rejections are improper because they combine nonanalogous references. According to appellants, in Bollee, the German



[\*1036] patent, the S.U. Carburetor, Shaw, and Hartshorn, the velocity of the air-fuel mixture at the venturi throat is necessarily subsonic in order for the venturi to perform its metering function. Furthermore, appellants submit that references relating to subsonic variable venturi carburetors are nonanalogous to references relating to sonic variable venturi carburetors and hence not properly combinable. Appellants also contend that the PTO did not give appropriate weight to the favorable evaluation of the claimed invention made by an impartial third party, the EPA, as evidence of the nonobviousness of their invention. With regard to the anticipation rejection, appellants maintain that in Winfield: varying the venturi by rotating the cylinder throttle changes the angular relationship of the venturi-defining walls; and fuel is introduced at and not before the venturi throat. n11/

n11/ Since we affirm the PTO's 103 rejections of claim 36, we do not need to reach the 102 rejection of that claim. However, in the interest of judicial economy, we point out that the claim limitation, providing that the venturi be varied "without changing either the coextensive or angular relationship" of the venturi-defining walls, is ambiguous. (Emphasis added.) This language can either mean that both the coextensive and the angular relationship must be unchanged or merely that at least one of these two relationships must be unchanged. Moreover, we note that if Winfield is an updraft carburetor, as alleged by the PTO, then fuel is introduced before the venturi throat created at the top of the cylinder throttle. [\*\*6]

#### OPINION

##### Nonanalogous Art

In resolving the question of obviousness under 35 USC 103, we presume full knowledge by the inventor of all the prior art in the field of his endeavor. However, with regard to prior art outside the field of his endeavor, we only presume knowledge from those arts reasonably pertinent to the particular problem with which the

inventor was involved. *In re Antle*, 58 CCPA 1382, 1387, 444 F.2d 1168, 1171-72, 170 USPQ 285, 287-88 (1971). The rationale behind this rule precluding rejections based on combination of teachings of references from nonanalogous arts is the realization that an inventor could not possibly be aware of every teaching in every art. Thus, we attempt to more closely approximate the reality of the circumstances surrounding the making of an invention by only presuming knowledge by the inventor of prior art in the field of his endeavor and in analogous arts.

The determination that a reference is from a nonanalogous art is therefore two-fold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with [\*\*7] which the inventor was involved.

In the case at bar, the references relating to subsonic variable venturi carburetors are clearly within the field of the inventors' endeavor. Appellants' assertions suggesting otherwise contradict statements made in their own specification. In the Background of Invention section of appellants' specification, appellants state that "the field of art to which the invention pertains includes the art of internal combustion engines and more particularly to such art as it applies to fuel and air induction systems therefor." Subsonic variable venturi carburetors fall squarely within this more realistic description of the field in which appellants endeavored.

Since we presume full knowledge by the inventor of all prior art in the field of his endeavor, the teachings of the subsonic variable venturi carburetors concerning alternative mechanisms for varying the flow area in the venturi throat are properly combinable with the teachings of the Eversole I patent concerning pollution reduction, i.e., that pollutant levels in automobile exhaust can be reduced by maintaining the speed of the air-fuel mixture through the venturi throat at sonic over a wide range [\*\*8] of intake manifold conditions. The argument that one cannot bodily incorporate the two sets of references because in one the speed of the air-fuel mixture is allegedly subsonic, whereas in the other it is sonic, is

[\*1037] irrelevant. The test for obviousness is not whether the features of one reference may be bodily incorporated into another reference. *In re Bozek*, 57 CCPA 713, 719, 416 F.2d 1385, 1390, 163 USPQ 545, 549-50 (1969); *In re Mapelsden*, 51 CCPA 1123, 1126, 329 F.2d 321, 322, 141 USPQ 30, 32 (1964). Rather, we look to see whether combined teachings render the claimed subject matter obvious.

#### Impartial Evaluation by Qualified Third Party

Of course, an evaluation of a claimed invention performed by an impartial, qualified third party is a valuable indication of the nonobviousness of an invention. However, just as with testing done by an applicant himself, such an evaluation must compare the claimed invention with the closest prior art in order to be meaningful. See *In re Merchant*, 575 F.2d 865, 869, 197 USPQ 785, 788 (CCPA 1978); *In re Holladay*, 584 F.2d 384, 386, 199 USPQ 516, 518 (CCPA 1978). Otherwise,

there is no basis for relating the claimed invention [\*\*9] to the prior art in order to conclude whether or not it is unexpectedly superior and therefore unobvious.

The EPA test data, while impressive, does not compare the claimed invention with the closest prior art, the Eversole I device. Consequently, this evaluation does not rebut the prima facie case of obviousness by proving that the claimed device is unexpectedly superior to the prior art. To the contrary, since the prior art Eversole I carburetor also provides for sonic velocity of the air-fuel mixture at the venturi throat over a wide range of intake manifold conditions, it too would be expected to reduce pollutant levels in an automobile's exhaust.

Accordingly, for the reasons set forth herein, the decision of the board is affirmed.

AFFIRMED

(II) Plaintiffs' Motion to Strike Jury Demand of the defendants pursuant to Rule 39(a)(2), Fed.R.Civ.P., is GRANTED.

**Patent and Trademark Office  
Board of Patent Appeals and Interferences**

Ex parte Dussaud

No. 666-06

Released June 9, 1988

**PATENTS**

**1. Practice and procedure in U.S. Patent and Trademark Office — Declaration/Affidavits (§110.0913)**

Examiner improperly held that declaration, which stated why artisan would not look to carpet manufacturing process and equipment field to solve problem in application of elastic to web in curvilinear pattern, was not persuasive on issue of whether particular reference constituted analogous prior art, since holding is improperly grounded on fact that declarant, though skilled in art of diaper manufacturing, is not expert on carpet making, and since examiner thus did not accord fair evidentiary weight to declarant's skepticism.

**2. Patentability/Validity — Obviousness — Relevant prior art (§115.0903)**

Examiner's characterization of problem addressed by applicants' claimed method of attaching elastic to disposable diapers as "the laminating of continuous running sheets utilizing a hot melt adhesive" was broader than particular problem actually addressed by applicants, and resulted in consideration of prior art that is not truly analogous.

**3. Patentability/Validity — Obviousness — Combining references (§115.0905)**

Examiner erred in holding that applicants' invention was obvious in view of two prior art references in combination, since there is no express or implied suggestion in teachings of two references which would have motivated person of ordinary skill in art to combine them in manner proposed by examiner.

Appeal from decision of Jerome Massey, primary examiner.

Patent application of Jacques Dussaud and Raphael De Jonckheere, serial no. 605,970, filed May 1, 1984. From decision refusing allowance of claims 10 through 18 and 21, applicants' appeal. Reversed.

I. William Millen and Millen & White, Arlington, Va., for applicants.

Before Milestone, Winters, and Skinner, examiners-in-chief.

Winters, examiner-in-chief.

Appeal from the examiner's decision refusing to allow claims 10 through 18 and 21, which are all the claims remaining in this application.

Claim 10 is representative:

10. A method of continuously attaching an elongated narrow elastic element to a moving flexible sheet material to be employed as an outer moisture impermeable envelope for receiving an absorbent pad of a disposable diaper, said elastic element fitting in a stretched condition substantially along a curvilinear-shaped-cut-out of said envelope to allow a leg therethrough when said envelope is constructed as a diaper, said method comprising the steps of:

(a) passing an elongated narrow elastic element, along a longitudinal path of travel, in a stretched condition;

(b) intermittently depositing liquid adhesive material at high temperature on said elastic element during said passing step (a);

(c) passing said elastic element, with adhesive material thereon, over a fixed guide means;

(d) passing said elastic element with adhesive material over a carriage means, arranged down-stream of the fixed guide means in the direction of travel, and capable of being moved intermittently in a transverse direction;

(e) feeding said flexible sheet around the peripheral surface of a rotary drum such that the sheet remains in contact with said drum for about one-half the rotation of said drum, said drum having a smooth outer surface which is maintained at a substantially constant temperature, said temperature being less than the temperature of said liquid adhesive, the difference between the temperature of the adhesive at the time of contact with said flexible sheet and the temperature of said peripheral surface of the drum being at least 20°C; and

(f) positioning said movable carriage immediately next to the periphery of said

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rotary drum at a location such that said carriage means and said drum are not in contact with each other and such that the adhesive coated elastic element contacts said flexible sheet supported by said drum, and said sheet together with said elastic element remain in contact with said drum for at least a portion of the rotation of said rotary drum before leaving it, moving said carriage means intermittently in a direction transverse to the direction of rotation of said drum whereby said elastic element is laid down on said drum in an oscillating path, and whereby said elastic element is intermittently attached in a stretched condition along a curved-shaped line only by laying said elastic element on said flexible sheet due to the temperature difference between the drum and the adhesive material;

and with the provision that steps (e) and (f) are conducted on a single drum and said temperature difference is sufficient to lead to an immediate adhesion effect capable of withstanding the transverse forces to which said elastic element is subjected owing to the movement of said carriage means.

The prior art references relied on by the examiner are:

Penman	3,150,023	Sep. 22, 1964
Bourgeois	3,828,367	Aug. 13, 1974
Buell	4,081,301	Mar. 28, 1978
Klasek et al.		
(Klasek)	4,293,367	Oct. 06, 1981
Teed	4,405,397	Sep. 20, 1983

Claims 10 through 16 and 21 stand rejected under 35 USC 103 as unpatentable over Klasek in view of the combined teachings of Buell, Penman, and Teed. Claims 17 and 18 stand rejected under the same statutory provision as unpatentable over the same combination of references, further taken in view of Bourgeois.

### OPINION

We shall not sustain these rejections.

Initially, we consider the question whether the Penman reference is from a nonanalogous art. First, we find it clear that this reference is not within the field of appellants' endeavor. On the contrary, Penman relates to the art of carpet manufacture whereas appellants' field of endeavor is the art of manufacturing disposable diapers. Indeed, each of the patents issued to Klasek, Buell, Teed, and Bourgeois relates to the art of making diapers, as does appellants' specifi-

cation disclosure. Penman, which stands apart, relates to the art of making carpets.

[1] Second, it is our judgment that Penman is not reasonably pertinent to the particular problem with which appellants were involved, i.e., the application of an elastic strip to a web in a curvilinear pattern. In determining this latter point, we have evaluated and weighed the Courtray declaration filed under Rule 132 wherein declarant sets forth reasons why the artisan "would not look to the carpet manufacturing process and equipment field to solve a problem in the application of elastic to a web in a curvilinear pattern". See Paper No. 15, page 1. We note that the examiner entered and considered the declaration (see Paper Nos. 18 and 22) but found same "not persuasive" because, according to the examiner, declarant merely offers his opinion on the art of carpet making. The examiner discounted that opinion because declarant is not established as an expert in that art. We disagree with the examiner's analysis. The examiner does not deny that declarant is skilled in the art of manufacturing diapers, although declarant does not claim to have the same level of skill in the art of making carpets. In this regard, we note that persons having ordinary skill "could not possibly be aware of every teaching in every art". See *In re Wood*, 559 F.2d 1032, 202 USPQ 171, 174 (CCPA 1979). Certainly, declarant expresses skepticism whether a person having ordinary skill in the art of manufacturing disposable diapers would consider the carpet manufacturing process and equipment filed as reasonably pertinent to the particular problem with which the appellants were involved. As stated in *In re Dow Chemical Company*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988), skepticism expressed by an expert in the art is entitled to fair evidentiary weight.

[2] We also find that the examiner's characterization of the problem in Paper No. 22, i.e., "the laminating of continuous running sheets utilizing a hot melt adhesive", is broader than the particular problem with which appellants were involved. Precise definition of the problem is important in determining whether a reference is from a nonanalogous art. Defining the problem too narrowly may result in excluding consideration of relevant prior art. By the same token, defining the problem too broadly, as done here, may result in considering prior art as "analogous" which is inconsistent with real world considerations. See *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337 (Fed. Cir. 1985), vacated, 475 U.S. 809, 229 USPQ 478 (1986), aff'd on

remand, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir. 1987).

Having applied the two-fold test for determining whether a reference is from a nonanalogous art, see *In re Wood*, *supra*, we hold that on the facts of this case the Penman reference constitutes nonanalogous art. It is therefore not available as a reference in evaluating the obviousness of appellants' claimed invention under 35 USC 103.

[3] Turning to a consideration of the Teed patent of record, we find that Teed discloses a method for manufacturing disposable diapers wherein elastic strips are applied in a straight line. This is illustrated in Figure 8, note rectilinear elastic strips (16) therein. Klasek, on the other hand, discloses a method for manufacturing disposable diapers wherein the elastic strips are applied in a curvilinear profile, and Klasek requires that the web and elastic be secured together by a pair of juxtaposed rolls acting in concert. See particularly Klasek, Figures 4 and 9. Certainly, Klasek's method involving a pair of rolls *could* be modified per the disclosure of Teed which appears to illustrate the use of a single roller. In our view, however, such proposed modification amounts to a hindsight reconstruction of the prior art patents in order to arrive at appellants' invention. Without having the benefit of appellants' disclosure, the artisan would view Klasek's pair of rolls as serving an important function in facilitating the application of elastic strips in a curvilinear profile. As discussed *supra*, the elastic strips in Teed are applied in a straight line and we disagree that the artisan would have found it obvious to substitute a single roller from Teed for a pair of rollers in Klasek, whose objective is to apply elastic strips in a curvilinear profile.

The mere fact that the prior art could be modified in the manner proposed by the examiner would not have made the modification obvious unless the prior art suggested the desirability of the modification. See *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) and cases cited therein. We have carefully reviewed the Klasek and Teed references in their entireties, and we find no express or implied suggestion in the collective teachings of these references which would have motivated the artisan to combine them in the manner proposed.

In conclusion, we hold that the Penman reference constitutes nonanalogous art and is therefore not available as a reference in evaluating the obviousness of appellants' claimed invention under 35 USC 103. With respect to the Teed patent of record, we conclude that Teed is not properly combinable with the "primary" reference to Klasek

in the manner proposed by the examiner. Penman and Teed are essential to the examiner's case of obviousness. The examiner does not contend, nor do we find, that the combination of Klasek and Buell or the combined teachings of Klasek, Buell and Bourgeois are sufficient to establish the obviousness of appellants' claimed invention. Accordingly, the examiner's decision refusing to allow claims 10 through 18 and 21 is reversed.

#### REVERSED.

District Court, N. D. Illinois

Olins v. Young & Rubicam Inc.

No. 87 C 4759

Decided February 8, 1988.

#### JUDICIAL PRACTICE AND PROCEDURE

##### 1. Procedure — Pleadings; bifurcation of proceedings (§410.28)

##### Procedure — Contempt; sanctions (§410.49)

Trademark infringement defendant which, in its answer to plaintiff's complaint alleging that defendant knew of plaintiff's use of and rights in mark "Consumer Insights," denied such allegation based on its interview with employee who was most likely to have knowledge of its use of mark has made reasonable inquiry to support its answer and thus imposition of sanctions is not warranted.

Action by Dr. Robert A. Olins against Young & Rubicam Inc., for service mark infringement, unfair competition, deceptive trade practices, consumer fraud and deceptive business practices, and dilution. On plaintiff's motion for sanctions. Motion denied.

David C. Hilliard, of Pattishall, McAuliffe & Hofstetter, Chicago, Ill., for plaintiff.

Robin J. Omahana, of Coffield Ungaretti Harris & Slavin, Chicago, and Alfred T.



LEXSEE 966 F2D 656

IN RE CARL D. CLAY

91-1402

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

966 F.2d 656; 1992 U.S. App. LEXIS 13091; 23 U.S.P.Q.2D (BNA) 1058

June 10, 1992, Decided

**PRIOR HISTORY:** [\*\*1] Appealed from: U.S. Patent and Trademark Office Board of Patent Appeals and Interferences

**DISPOSITION:** REVERSED.

**CASE SUMMARY:**

**PROCEDURAL POSTURE:** Inventor appealed the judgment of the United States Patent and Trademark Office Board of Patent Appeals and Interferences, which affirmed the patent examiner's rejection of claims in its patent application for being unpatentable under 35 U.S.C.S. § 103.

**OVERVIEW:** Inventor applied for a patent for his process of storing refined liquid hydrocarbon product, to which two prior art references were applied by the patent examiner. The board affirmed the patent examiner's rejection of claims in inventor's patent application as being unpatentable under 35 U.S.C.S. § 103 for obviousness. On appeal, the court found that it was error to find the claims in the patent were obvious based on the references to nonanalogous prior art because the art was not with the inventor's field of endeavor or reasonably pertinent to the problem that the inventor attempted to solve with his invention. The court reversed, finding that one having ordinary skill in the art would not reasonably have expected to solve the problem the inventor's process was directed at by considering a reference to nonanalogous prior art.

**OUTCOME:** The judgment was reversed. The court found that rejection of inventor's claims for obviousness under patent law was improper where the patent

examiner had rejected the application based upon an application of non-analogous prior art.

**CORE TERMS:** gel, volume, dead, formation, invention, liquid, endeavor, tank, hydrocarbon, refined, inventor, anomaly, matrix, storage tank, petroleum, gelation, storage, oil, combined, storing, skill, rigid, subject matter, solve, underground, comprising, permeability, subterranean, impervious, discloses

**LexisNexis (TM) HEADNOTES - Core Concepts:**

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***

[HN1] A prerequisite to making the finding of obviousness is determining what is "prior art," in order to consider whether the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. 35 U.S.C.S. § 103. Although 35 U.S.C.S. § 103 does not, by its terms, define the art to which the subject matter sought to be patented pertains, this determination is frequently couched in terms of whether the art is analogous or not, whether the art is too remote to be treated as prior art.

***Civil Procedure > Trials > Bench Trials Patent Law > Jurisdiction & Review > Standards of Review***

[HN2] Whether a reference in the prior art is analogous is a fact question. Thus, an appellate court reviews the Board's decision on this point under the clearly erroneous standard.

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***

[HN3] Two criteria determine whether prior art is analogous: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.

**Patent Law > Nonobviousness > Tests & Proof of Obviousness**

[HN4] A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.

**COUNSEL:** Jack E. Ebel, Marathon Oil Company, of Littleton, Colorado, argued for appellant. With him on the brief was Paul T. Meiklejohn, Seed & Berry, of Seattle, Washington, of counsel.

Teddy S. Gron, Associate Solicitor, Office of The Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief was Fred E. McKelvey, Solicitor. Of counsel was Richard E. Schafer.

**JUDGES:** Before PLAGER, LOURIE, and CLEVENGER, Circuit Judges.

**OPINIONBY:** LOURIE

**OPINION:** [\*657]

LOURIE, Circuit Judge.

Carl D. Clay appeals the decision of the United States Patent and Trademark Office, Board of Patent Appeals and Interferences, Appeal No. 90-2262, affirming the rejection of claims 1-11 and 13 as being unpatentable under 35 U.S.C. § 103. These are all the remaining claims in application Serial No. 245,083, filed April 28, 1987, entitled "Storage of a Refined Liquid Hydrocarbon Product." We reverse.

**BACKGROUND**

Clay's invention, assigned to Marathon Oil Company, is a process for storing refined liquid hydrocarbon product in a storage tank having a dead volume between the tank bottom and its outlet port. The process involves preparing a [\*2] gelation solution which gels after it is placed in the tank's dead volume; the gel can easily be removed by adding to the tank a gel-degrading agent such as hydrogen peroxide. Claims 1, 8, and 11 are illustrative of the claims on appeal:

1. A process for storing a refined liquid hydrocarbon product in a storage tank having a dead volume between the bottom of said tank and an outlet port in said tank, said process comprising:

preparing a gelation solution comprising an aqueous liquid solvent, an acrylamide polymer and a crosslinking agent containing a polyvalent metal cation selected from the group consisting of aluminum, chromium and mixtures thereof, said gelation solution capable of forming a rigid crosslinked polymer gel which is [\*658] substantially insoluble and inert in said refined liquid hydrocarbon product;

placing said solution in said dead volume;

gelling said solution substantially to completion in said dead volume to produce said rigid gel which substantially fills said dead volume; and

storing said refined liquid hydrocarbon product in said storage tank in contact with said gel without substantially contaminating said product with said gel and without substantially degrading [\*3] said gel.

8. The process of claim 1 further comprising removing said rigid gel from said dead volume by contacting said gel with a chemical agent which substantially degrades said gel to a flowing solution.

11. The process of claim 1 wherein said gelation solution further comprises an aqueous liquid contaminant present in said dead volume which dissolves in said solution when said solution is placed in said dead volume.

Two prior art references were applied against the claims on appeal. They were U.S. Patent 4,664,294 (Hetherington), which discloses an apparatus for displacing dead space liquid using impervious bladders, or large bags, formed with flexible membranes; and U.S. Patent 4,683,949 (Sydansk), also assigned to Clay's assignee, Marathon Oil Company, which discloses a process for reducing the permeability of hydrocarbon-bearing formations and thus improving oil production, using a gel similar to that in Clay's invention.

The Board agreed with the examiner that, although neither reference alone describes Clay's invention, Hetherington and Sydansk combined support a conclusion of obviousness. It held that one skilled in the art would glean from Hetherington that Clay's invention [\*4] "was appreciated in the prior art and solutions to that problem generally involved filling the dead space with something." Opinion at 3 (emphasis in original).

The Board also held that Sydansk would have provided one skilled in the art with information that a gelation system would have been impervious to hydrocarbons once the system gelled. The Board

combined the references, finding that the "cavities" filled by Sydansk are sufficiently similar to the "volume or void space" being filled by Hetherington for one of ordinary skill to have recognized the applicability of the gel to Hetherington.

#### DISCUSSION

The issue presented in this appeal is whether the Board's conclusion was correct that Clay's invention would have been obvious from the combined teachings of Hetherington and Sydansk. Although this conclusion is one of law, such determinations are made against a background of several factual inquiries, one of which is the scope and content of the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

[HN1] A prerequisite to making this finding is determining what is "prior art," in order to consider whether "the differences between [\*\*5] the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103. Although § 103 does not, by its terms, define the "art to which [the] subject matter [sought to be patented] pertains," this determination is frequently couched in terms of whether the art is analogous or not, i.e., whether the art is "too remote to be treated as prior art." *In re Sovish*, 769 F.2d 738, 741, 226 USPQ 771, 773 (Fed. Cir. 1985).

Clay argues that the claims at issue were improperly rejected over Hetherington and Sydansk, because Sydansk is nonanalogous art. [HN2] Whether a reference in the prior art is "analogous" is a fact question. *Panduit Corp. v. Dennison Mfg.*, 810 F.2d 1561, 1568 n.9, 1 USPQ2d 1593, 1597 n.9 (Fed. Cir.), cert. denied, 481 U.S. 1052 (1987). Thus, we review the Board's decision on this point under the clearly erroneous standard.

[HN3] Two criteria have evolved for determining whether prior art is analogous: (1) [\*\*659] whether the art is from the same field [\*\*6] of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979).

The Board found Sydansk to be within the field of Clay's endeavor because, as the Examiner stated, "one of ordinary skill in the art would certainly glean from [Sydansk] that the rigid gel as taught therein would have a number of applications within the manipulation of the

storage and processing of hydrocarbon liquids . . . [and that] the gel as taught in Sydansk would be expected to function in a similar manner as the bladders in the Hetherington patent." These findings are clearly erroneous.

The PTO argues that Sydansk and Clay's inventions are part of a common endeavor -- "maximizing withdrawal of petroleum stored in petroleum reservoirs." However, Sydansk cannot be considered to be within Clay's field of endeavor merely because both relate to the [\*\*7] petroleum industry. Sydansk teaches the use of a gel in unconfined and irregular volumes within generally underground natural oil-bearing formations to channel flow in a desired direction; Clay teaches the introduction of gel to the confined dead volume of a man-made storage tank. The Sydansk process operates in extreme conditions, with petroleum formation temperatures as high as 115degreeC and at significant well bore pressures; Clay's process apparently operates at ambient temperature and atmospheric pressure. Clay's field of endeavor is the storage of refined liquid hydrocarbons. The field of endeavor of Sydansk's invention, on the other hand, is the extraction of crude petroleum. The Board clearly erred in considering Sydansk to be within the same field of endeavor as Clay's.

Even though the art disclosed in Sydansk is not within Clay's field of endeavor, the reference may still properly be combined with Hetherington if it is reasonably pertinent to the problem Clay attempts to solve. *In re Wood*, 599 F.2d at 1036, 202 USPQ at 174. [HN4] A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's [\*\*8] endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. Thus, the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve. If a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. An inventor may well have been motivated to consider the reference when making his invention. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

Sydansk's gel treatment of underground formations functions to fill anomalies n1 so as to improve flow profiles and sweep efficiencies of injection and production fluids through a formation, while Clay's gel functions to displace liquid product from the dead volume of a storage tank. Sydansk is concerned with plugging formation anomalies so that fluid is



subsequently diverted by the gel into the formation matrix, thereby forcing bypassed [\*\*9] oil contained in the matrix toward a production well. Sydansk is faced with the problem of recovering oil from rock, i.e., from a matrix which is porous, permeable sedimentary rock of a subterranean formation where water has channeled through formation anomalies and bypassed oil present in the matrix. Such a problem is not reasonably pertinent to the particular problem with which Clay was involved -- preventing loss of stored [\*660] product to tank dead volume while preventing contamination of such product. Moreover, the subterranean formation of Sydansk is not structurally similar to, does not operate under the same temperature and pressure as, and does not function like Clay's storage tanks. See *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973) ("the similarities and differences in structure and function of the invention disclosed in the references . . . carry far greater weight [in determining analogy]").

n1 Sydansk refers to an anomaly, one of two general region types in an oil-bearing geological

formation, as "a volume or void space [e.g., 'streaks, fractures, fracture networks, vugs, solution channels, caverns, washouts, cavities, etc.'] in the formation having very high permeability relative to the matrix [the other region type, consisting of homogeneous porous rock]."

[\*\*10]

A person having ordinary skill in the art would not reasonably have expected to solve the problem of dead volume in tanks for storing refined petroleum by considering a reference dealing with plugging underground formation anomalies. The Board's finding to the contrary is clearly erroneous. Since Sydansk is non-analogous art, the rejection over Hetherington in view of Sydansk cannot be sustained.

CONCLUSION

For the foregoing reasons, the decision of the Board is REVERSED.



LEXSEE 993 F2D 858

**WANG LABORATORIES, INC., Plaintiff/Cross-Appellant, v. TOSHIBA CORPORATION; TOSHIBA AMERICA ELECTRIC COMPONENTS, INC.; TOSHIBA AMERICA INFORMATION SYSTEMS, INC., Defendants-Appellants, and NEC CORPORATION; NEC ELECTRONICS INC. and NEC TECHNOLOGIES, INC., Defendants-Appellants, and MOLEX INCORPORATED, Defendant.**

92-1006, 92-1008, 92-1025

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*993 F.2d 858; 1993 U.S. App. LEXIS 10913; 26 U.S.P.Q.2D (BNA) 1767; 93 Daily Journal DAR 9496*

**May 10, 1993, Decided**

**SUBSEQUENT HISTORY:** Petition for Rehearing Denied and In Banc Suggestion Declined June 28, 1993, Reported at: *1993 U.S. App. LEXIS 16803*.

**PRIOR HISTORY:** [**\*\*1**] Appealed from: U.S. District Court for the Eastern District of Virginia. Judge Ellis, III

**DISPOSITION:** AFFIRMED-IN-PART, REVERSED-IN-PART, AND REMANDED-IN-PART

**CASE SUMMARY:**

**PROCEDURAL POSTURE:** Defendants appealed the judgment of the United States District Court for the Eastern District of Virginia, which denied their motions for judgment notwithstanding the verdict. Plaintiff appealed the district court's denial of its motion to amend the judgment as to damages in the patent infringement suit.

**OVERVIEW:** This patent infringement suit involved two patents on memory modules. The jury returned a verdict in favor of plaintiff, finding that defendants had infringed upon plaintiff's patents. The jury also determined that plaintiff was entitled to reasonable royalty as compensation for the infringement. On appeal, defendants argued that the claims in suit were invalid for obviousness under *35 U.S.C.S. § 103*. The court held that defendants failed to show that the claimed subject

matter would have been obvious to a person having ordinary skill in the art at the time plaintiff's inventions were made. The court also held that plaintiff met the written description requirement under *35 U.S.C.S. § 112*. However, prosecution history estoppel barred plaintiff's infringement claims regarding defendants' lateral and three-pack memory modules.

**OUTCOME:** The court reversed the district court's judgment denying defendants' joint motion for judgment notwithstanding the verdict on the issue of infringement by defendants' sale of lateral and three-pack memory modules and reversed the damage determination. The rest of the judgment was affirmed.

**CORE TERMS:** memory, chip, module, patent, input, infringement, royalty, single row, printed circuit, substrate, negotiation, invention, mounted, subject matter, hypothetical, lateral, estoppel, leadless, byte, pack, bit, terminal, output, written description, royalty rate, substantial evidence, infringed, detection, leaded, storing

**LexisNexis (TM) HEADNOTES - Core Concepts:**

*Civil Procedure > Trials > Judgment as Matter of Law*  
*Civil Procedure > Appeals > Standards of Review*  
[HN1] On appeal of a judgment entered on a verdict after denial of a motion for judgment notwithstanding the verdict, defendants must show (1) that reasonable

persons could not in light of evidence before them have found the facts necessary to support the jury's verdict; or (2) that the facts properly found cannot in law support that verdict.

***Civil Procedure > Appeals > Standards of Review***

[HN2] Fact findings reviewed under the substantial evidence standard require affirmance unless appellants show that no reasonable juror could have reached such a result.

***Civil Procedure > Appeals > Standards of Review***

[HN3] In reviewing the evidence from a denial of a judgment notwithstanding the verdict, the appellate court must (1) consider all the evidence, (2) in a light most favorable to the non-mover, (3) drawing reasonable inferences favorable to the nonmover, (4) without determining credibility of witnesses, and (5) without substituting the appellate court's choice for that of the jury between conflicting elements in the evidence.

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***

[HN4] See 35 U.S.C.S. § 103.

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***  
***Patent Law > Jurisdiction & Review > Standards of Review***

[HN5] Nonobviousness is a legal conclusion, having factual underpinnings, including the scope and content of the prior art. When the factual underpinnings have been genuinely disputed, the appellate court presumes that the jury resolved them in favor of the verdict winner.

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***

[HN6] Analogous art is that which is relevant to a consideration of obviousness under 35 U.S.C.S. § 103.

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***

[HN7] Whether something legally within the prior art is analogous is a fact question. Two criteria are relevant in determining whether prior art is analogous: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the art is not within the same field of endeavor, whether it is still reasonably pertinent to the particular problem to be solved.

***Patent Law > Nonobviousness > Tests & Proof of Obviousness***

[HN8] A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have

commended itself to an inventor's attention in considering his problem.

***Patent Law > Specification & Claims > Description Requirement***

[HN9] See 35 U.S.C.S. § 112.

***Patent Law > Specification & Claims > Description Requirement***

[HN10] The standard for determining whether the written description requirement has been met has been stated as follows: Although the applicant does not have to describe exactly the subject matter claimed, the description must clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed. The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter.

***Patent Law > Specification & Claims > Description Requirement***

[HN11] Whether the written description requirement has been met is a question of fact.

***Patent Law > Specification & Claims > Description Requirement***

[HN12] A patent specification is directed to one of ordinary skill in the art.

***Patent Law > Specification & Claims > Description Requirement***

[HN13] Drawings alone may provide a written description of an invention as required by 35 U.S.C.S. § 112.

***Civil Procedure > Appeals > Reviewability > Notice of Appeal***

[HN14] Normally an issue not raised by an appellant in its initial brief is waived. However, this practice is not governed by a rigid rule but may as a matter of discretion not be adhered to where circumstances indicate that it would result in basically unfair procedure.

***Patent Law > Infringement > Prosecution History Estoppel***

[HN15] Prosecution history estoppel bars a patentee from enforcing its claims against otherwise legally equivalent structures if those structures were excluded by claim limitations added in order to avoid prior art.

***Patent Law > Infringement > Prosecution History Estoppel***

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[HN16] In determining whether prosecution history estoppel applies because of a change in claim language during prosecution, the court must consider not only what was changed, but the reason for such change.

***Patent Law > Infringement > Prosecution History Estoppel***

[HN17] Whether estoppel applies is a question of law.

***Patent Law > Infringement > Prosecution History Estoppel***

[HN18] Unmistakable assertions made by the applicant to the Patent and Trademark Office (PTO) in support of patentability, whether or not required to secure allowance of the claim, might operate to preclude the patentee from asserting equivalency. Depending on the nature and purpose of an amendment, it may have a limiting effect within a spectrum ranging from great to small to zero.

***Patent Law > Infringement > Prosecution History Estoppel***

[HN19] The prosecution history must be examined as a whole in determining whether estoppel applies.

***Civil Procedure > Summary Judgment Civil Procedure > Trials > Judgment as Matter of Law***

[HN20] Although it is true that the standard for summary judgment is virtually the same as that for a directed verdict, viz., that there can be but one reasonable conclusion as to the verdict, this does not mean that a motion for summary judgment is a substitute for a motion for directed verdict. *Fed. R. Civ. P. 50(b)* requires a motion for a directed verdict as a prerequisite to a motion for judgment notwithstanding the verdict. A motion for summary judgment before trial is not a substitute for a motion for directed verdict at the close of all the evidence.

***Civil Procedure > Appeals > Standards of Review > Abuse of Discretion***

[HN21] An abuse of discretion occurs when a court bases its determination on clearly erroneous factual findings, legal error, or a manifest error of judgment.

***Patent Law > Remedies > Damages***

[HN22] See 35 U.S.C.S. § 284 (1988).

***Patent Law > Remedies > Damages***

[HN23] When actual damages cannot be adequately proved, a reasonable royalty may be employed. A reasonable royalty is the amount that a person, desiring to manufacture, use, or sell a patented article, as a business proposition, would be willing to pay as a

royalty and yet be able to make, use, or sell the patented article, in the market, at a reasonable profit.

***Patent Law > Remedies > Damages***

[HN24] When an established royalty does not exist, a court may determine a reasonable royalty based on hypothetical negotiations between willing licensor and willing licensee. The key element in setting a reasonable royalty is the necessity for return to the date when the infringement began.

***Patent Law > Remedies > Damages***

[HN25] Failure to mark patented goods is a limitation on recovery of damages, in the absence of notice. 35 U.S.C.S. § 287 (1988).

**COUNSEL:** Thomas J. Scott, Howrey & Simon, of Washington, D.C., argued for plaintiff/cross-appellant. With him on the brief were Robert F. Ruyak, Sheila R. Schreiber and Diane B. Heller. Also on the brief were Edward A. Grayson, Michael H. Shanahan and Paul W. Sandman, Want Laboratories, Inc., Lowell, Massachusetts.

Edward F. McKie, Banner, Birch, McKie & Beckett, of Washington, D.C., argued for defendants-appellants, Toshiba Corporation. With him on the brief were Dale H. Hoscheit, Joseph M. Skerpon, Richard J. Moura and Pamela I. Banner. Howard L. Bernstein, Sughrue, Mion, Zinn, MacPeak & Seas, of Washington, D.C., argued for defendants-appellants, NEC Corporation. With him on the brief were J. Frank Osha, L. Peter Bernstein and Brett S. Sylvester.

**JUDGES:** Before ARCHER, LOURIE, and CLEVINGER, Circuit Judges.

**OPINIONBY:** LOURIE

**OPINION:** [\*860] LOURIE, Circuit Judge.

This is a patent infringement suit involving two patents on memory modules. It comes to us as a consolidated appeal and cross-appeal from the August 23, 1991 judgment and the October 23, 1991 amended judgment of the [\*\*2] United States District Court for the Eastern District of Virginia, Civil No. 90-1477-A. On August 8, 1991, a jury returned a verdict in favor of Wang Laboratories, Inc., finding U.S. Patents 4,656,605 and 4,727,513 infringed by Toshiba Corporation, Toshiba America Electronic Components, Inc., and Toshiba America Information Systems, Inc. (collectively Toshiba) and NEC Corporation, NEC Electronics Inc., and NEC Technologies, Inc. (collectively NEC), and not invalid. The jury found that NEC had willfully infringed the patents in suit, while Toshiba's infringement was not

willful. On August 14, 1991, the jury determined that Wang was entitled to a reasonable royalty as compensation for the infringement and determined alternative reasonable royalty rates. On August 23, 1991, the district court entered judgment in accordance with the jury verdicts, ruled that the patents were not invalid and were infringed, and awarded a reasonable royalty as damages.

Toshiba and NEC filed post-trial motions for judgment notwithstanding the verdict (JNOV), n1 which the district court subsequently denied. n2 Wang moved to amend the judgment as to damages; this motion was also denied. Toshiba and NEC now [\*\*3] appeal from the district court's judgment denying JNOV on the issues of validity and infringement. Wang cross-appeals the district [\*\*61] court's failure to amend the judgment as to the royalty rate. We affirm-in-part, reverse-in-part, and remand-in-part.

n1 The case was heard and decided prior to December 1, 1991, the effective date of the amendment to *Fed. R. Civ. P. 50(b)*, which now refers to JNOV as judgment as a matter of law. We will use the former terminology in this opinion.

n2 However, NEC moved for an order denying enhanced damages, and this was granted. Because Wang does not appeal this issue, NEC does not appeal the finding of willfulness.

## BACKGROUND

The '605 and '513 patents, both entitled "Single In-Line Memory Module," were issued in the name of James E. Clayton and assigned to Wang. The '605 patent issued on April 7, 1987, and the '513 patent on February 23, 1988 from a continuation of the application that led to the '605 patent. n3

n3 Because of a terminal disclaimer, both patents will expire on April 7, 2004.

[\*\*4]

The patents relate to single in-line memory modules (SIMMs) having eight data memory chips capable of storing 8-bit binary words or bytes. n4 Additionally, the memory-modules include a ninth chip, which functions as a check or parity bit for error detection. n5 The nine memory chips, which are packaged in plastic leaded chip carriers (PLCCs), are mounted on a single epoxy-glass printed circuit board substrate. Decoupling capacitors for suppressing voltage spikes are also mounted on the

memory module substrate. Preferably, access terminals are arrayed across the bottom of the device for data input and output, data address and memory control, and device power. The '605 patent claims require that the ninth chip be interconnected with the other eight, while the '513 patent claims do not require this interconnection so that the parity chip can be written to or read from independently of the eight data chips.

n4 In digital systems such as computers, information is stored in memory chips as binary digits (bits). Each memory chip contains thousands of memory cells, each storing a bit. An eight-bit binary word is known as a byte. Memory chips can be mounted on a substrate to form a memory module. Conventionally, a memory module for a byte contains eight memory chips. [\*\*5]

n5 A parity bit is commonly used for error detection in a stored byte. A bit contains either a logical "1" or "0." The parity bit signifies whether the sum of the bits in a byte is even or odd. An error may be detected by checking the odd or even count in a byte against the parity bit associated with that byte.

The '605 patent contains one claim, which reads as follows:

A memory module for installation on a printed circuit motherboard comprising:

eight data memory chips for storing digital data, each having a data input and output, a control input, and an address input, and each being packaged in a plastic leaded chip carrier;

a ninth memory chip for storing error detection and correction information associated with the eight data memory chips, said ninth memory chip having a data input and output, a control input and an address input interconnected with those of the eight memory chips, and a control input to provide writing in or reading out of the ninth memory chip at times other than when said bytes of digital information are written into or read out of the eight data memory chips [\*\*6] to thereby facilitate said error detection and correction operation;

an epoxy-glass printed circuit board substrate having a length and width adequate for mounting thereon only in a single row said nine memory chips and for interconnecting the control inputs and the address inputs of the memory chips so that bytes of digital information may be input to or output from the memory chips one at a time;

the substrate including thirty terminals for providing access to the data inputs and outputs, control inputs, and address inputs of the nine memory chips to enable reading and writing of bytes of digital information into and out of the eight memory chips and to enable reading and writing of error detection and correction information into and out of the eight memory chips;

support means for supporting the memory module at an angle with respect to the printed circuit motherboard when the memory module is installed thereon; and

eight decoupling capacitors, mounted on said substrate and connected between the nine memory chips, for suppressing transient voltage spikes between said memory chips.

(Emphasis added).

The '513 patent contains Claims 1 and 2, which read as follows: [\*\*7]

[\*862] 1. A memory module for installation on a printed circuit motherboard comprising

nine data memory chips for storing digital data, each having a data input and output, control input, and an address input, and each being packaged in a plastic leaded chip carrier, wherein said ninth memory chip is for storing detection and correction information associated with the eight data memory chips,

an epoxy-glass printed circuit board substrate having a length and width adequate for mounting thereon only in a single row said nine memory chips and for interconnecting the control inputs and the address inputs of the memory chips so

that bytes of digital information may be input to or output from the memory chips,

the substrate including thirty terminals for providing access to the data inputs and outputs, control inputs, and address inputs of the nine memory chips and to enable reading and writing of information into and out of the nine chips,

support means for supporting the memory module at an angle with respect to a motherboard and

decoupling capacitors mounted on said substrate and coupled to the memory chips for suppressing transient voltages.

2. The module of claim 1 [\*\*8] wherein all nine memory chips are interconnected such that data is input to or output from the ninth memory chips when data is input to or output from the other eight memory chips.

(Emphasis added).

Toshiba and NEC manufacture several different types of memory modules, including (1) classic nine-chip modules, which have eight data chips and one error detection chip arranged in a single row on a printed circuit board substrate; (2) 3-pack modules, which have three chips arranged in a single row, two half-bytes, which read and store four bits of information each, and a parity chip; and (3) lateral modules, which have nine chips arranged in more than a single row. Of these modules, some are leaded, i.e., electrical leads extend from the module substrate and electrically connect the module to a printed circuit motherboard, and some are leadless, i.e., an edge of the module is designed to mate with a socket attached to a printed circuit motherboard. The jury found, inter alia, that the classic modules literally infringed claim 1 of the '513 patent and infringed claim 1 of the '605 patent and claim 2 of the '513 patent under the doctrine of equivalents; the 3-pack modules (all leadless) [\*\*9] infringed claim 1 of both patents under the doctrine of equivalents; and the lateral modules infringed claim 1 of both patents under the doctrine of equivalents. n6

n6 Toshiba and NEC also manufacture Multi-9 modules, having multiple combinations of nine data bits, which were found not to infringe.

Wang also accused NEC and Toshiba of infringing U.S. Patent 4,850,892, entitled

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"Connecting Apparatus for Electrically Connecting Memory Modules to a Printed Circuit Board." Molex Inc., a manufacturer of SIMM sockets, intervened as a defendant to challenge the accusation of infringement. On Molex's motion for summary judgment, the district court held the '892 patent invalid for violation of the on-sale bar under 35 U.S.C. § 102(b).

The jury determined two reasonable royalty rates, one 4.0%, assuming hypothetical royalty negotiations to have occurred in April 1987, the date when the '605 patent issued, and the other 2.75%, assuming hypothetical royalty negotiations to have occurred in [\*\*10] January 1990, the date Wang gave notice of infringement. The court adopted January 1990 as the date when hypothetical royalty negotiations occurred, making the royalty rate 2.75%. The parties stipulated to the amount of infringing sales, excluding sales covered by a licensing agreement between Wang and IBM, as being \$ 31,106,509 by NEC and \$ 88,121,819 by Toshiba. The court awarded double damages to Wang for NEC's willful infringement. Based on a 2.75% royalty rate, Wang was awarded \$ 855,429 to be paid by NEC and \$ 2,423,350 to be paid by Toshiba, plus prejudgment interest of 8.0% per annum from October 1, 1990 to August 23, 1991, the date of entry of judgment, plus post-judgment interest at the statutory rate. The court also issued a permanent injunction against both Toshiba and NEC. n7

n7 This court denied NEC and Toshiba's emergency motion for a stay of the injunction order. Wang Lab., Inc. v. Toshiba Corp., Nos. 92-1006, -1008 (Fed. Cir. Oct. 8, 1991).

[\*863] Toshiba and NEC jointly moved for JNOV on the issues of [\*\*11] best mode, written description, obviousness, and infringement, all of which were denied. NEC moved for JNOV on the issues of willfulness, which was denied, and enhanced damages, which was granted. Wang moved to amend the judgment as to the date of the hypothetical negotiations, to increase the enhanced damages, and for attorney fees, all of which were denied. Toshiba and NEC now appeal from the district court's judgment denying JNOV on the issues of obviousness, failure to meet the written description requirement, and infringement. Wang cross-appeals the court's failure to amend the judgment as to the reasonable royalty rate.

#### DISCUSSION

#### I. Standard of Review from Denial of JNOV on Infringement and Validity

[HN1] On appeal of a judgment entered on a verdict after denial of a motion for JNOV, Toshiba and NEC must show

- (1) that reasonable persons could not in light of [ ] evidence [before them] have found the facts necessary to support the jury's verdict; or (2) that the facts properly found cannot in law support that verdict.

*Railroad Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1513, 220 U.S.P.Q. (BNA) 929, 936 (Fed. Cir.), cert. denied, [\*\*12] 469 U.S. 871, 83 L. Ed. 2d 150, 105 S. Ct. 220 (1984). [HN2] Fact findings reviewed under the substantial evidence standard require affirmance unless appellants show that no reasonable juror could have reached such a result. Id. [HN3] In reviewing the evidence from a denial of JNOV, we must

- (1) consider all the evidence, (2) in a light most favorable to the non-mover[,] (3) drawing reasonable inferences favorable to the nonmover[,] (4) without determining credibility of witnesses, and (5) without substituting [our] choice for that of the jury between conflicting elements in the evidence.

*Dana Corp. v. IPC Ltd. Partnership*, 860 F.2d 415, 417, 8 U.S.P.Q.2D (BNA) 1692, 1694-95 (Fed. Cir. 1988) (citations omitted), cert. denied, 490 U.S. 1067, 104 L. Ed. 2d 633, 109 S. Ct. 2068 (1989).

#### II. Obviousness

Toshiba and NEC argue that the claims in suit are invalid for obviousness under 35 U.S.C. § 103 (1988). n8 Specifically, they state that the claimed subject matter would have been obvious in view of U.S. Patent 4,281,392 assigned to Allen-Bradley Company, sales of Allen-Bradley's X9 SIMMs, and Texas Instruments 1982 MOS Memory [\*\*13] Data Book. The appellants further assert that the district court erroneously read limitations into the claims, viz., use of the memory modules in a "personal computer"; attributes of greater storage capacity and less cost for the memory modules compared with those in the prior art; and possession of exactly 30 terminals. While we agree that the claims do not contain these limitations, we do not find this to be determinative on the question of nonobviousness. There is substantial evidence that certain of the prior art was not analogous, and hence the validity of the claims can be upheld for that reason.

n8 [HN4] Section 103 states that

[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. . . .

-----End Footnotes-----  
 ----- [HN5] -----

Nonobviousness is a legal conclusion, having factual underpinnings, [\*\*14] including the scope and content of the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. (BNA) 459, 467, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966). "When the Graham factual underpinnings have been genuinely disputed, as in this case, we presume that the jury resolved them in favor of the verdict winner." *Jurgens v. McKasy*, 927 F.2d 1552, 1558, 18 U.S.P.Q.2D (BNA) 1031, 1036 (Fed. Cir.) (citing *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893, 221 U.S.P.Q. (BNA) 669, 674 (Fed. Cir.), cert. denied, 469 U.S. 857, 83 L. Ed. 2d 120, 105 S. Ct. 187 (1984)), cert. denied, 112 S. Ct. 281 (1991); see also *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 765, 9 U.S.P.Q.2D (BNA) 1417, 1423 (Fed. Cir. 1988) ("Judges must accept the factual findings, presumed from a favorable jury [\*864] verdict, which are supported under the substantial evidence/reasonable juror standard."), cert. denied, 493 U.S. 814, 107 L. Ed. 2d 30, 110 S. Ct. 62 (1989).

Appellants assert that Allen-Bradley's '392 patent and its commercial counterpart, the X9 SIMM, are [\*\*15] analogous to the claimed subject matter, and accordingly that they are effective to render the claims in suit invalid. However, because of the adequate jury instruction concerning analogous art, we will presume that the Allen-Bradley art was found to be non-analogous to the claimed subject matter. The question then is whether that finding is supported by substantial evidence. We conclude that there was substantial evidence.

[HN6] Analogous art is that which is relevant to a consideration of obviousness under section 103. See *In re Sovish*, 769 F.2d 738, 741, 226 U.S.P.Q. (BNA) 771, 773 (Fed. Cir. 1985). "Whether [HN7] something legally within the prior art is 'analogous' is a fact question . . . ." *Panduit Corp. v. Dennison Mfg. Co.*, 810

F.2d 1561, 1568 n.9, 1 U.S.P.Q.2D (BNA) 1593, 1597 n.9 (Fed. Cir.), cert. denied, 481 U.S. 1052, 95 L. Ed. 2d 843, 107 S. Ct. 2187 (1987). Two criteria are relevant in determining whether prior art is analogous: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the art is not within the same field of endeavor, whether it is still reasonably [\*\*16] pertinent to the particular problem to be solved. *In re Clay*, 966 F.2d 656, 658-59, 23 U.S.P.Q.2D (BNA) 1058, 1060 (Fed. Cir. 1992) (citations omitted).

The '392 patent is entitled "Memory Circuit for Programmable Machines"; it discloses a SIMM containing nine memory chips, eight for storing data and one for error detection, mounted in a single row. In the late 1970's, Allen-Bradley manufactured and sold the X9 SIMM for use in its 9-bit programmable controller. This product consisted of nine memory chips encapsulated in ceramic dual in-line packages (ceramic DIPs) mounted on an epoxy-glass printed circuit board substrate.

The Allen-Bradley art is not in the same field of endeavor as the claimed subject matter merely because it relates to memories. It involves memory circuits in which modules of varying sizes may be added or replaced; in contrast, the subject patents teach compact modular memories. Thus, based on the evidence of record, the jury could reasonably have found that the first criterion of the analogous art test has not been met and that the prior art and the claimed subject matter are not in the same field of endeavor.

Even though the [\*\*17] Allen-Bradley art is not within the relevant field of endeavor, it may still be analogous if it is reasonably pertinent to the problem the inventor attempted to solve. *Id.* at 659, 23 U.S.P.Q.2D (BNA) at 1060-61 (citation omitted). "A [HN8] reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." *Id.* at 659, 23 U.S.P.Q.2D (BNA) at 1061. However, given the jury's ultimate conclusion, we presume that the jury decided that the Allen-Bradley art was not reasonably pertinent. The question then is whether that conclusion is supported by substantial evidence.

Dr. Jeffrey Frey, Wang's technical expert, testified that the Allen-Bradley technology, including the SIMM described in the patent and the X9, was not pertinent to the field of personal computers for which Wang's SIMMs were designed. Although Wang's patents do not mention the term "personal computer," Dr. Frey stated that "the entire context of the patent[s] [\*\*18] -- in the application of the memories, units of nine, dynamic memories -- indicates they're meant for use in personal



computers." Dr. Frey further testified that the Allen-Bradley module was developed for use in a controller of large industrial machinery and could not be used in a personal computer. He also stated that the Allen-Bradley patent teaches the use of Static Random-Access-Memories (SRAMs) or Read-Only-Memories (ROMs) and does not suggest the use of Dynamic Random-Access-Memories (DRAMs) as taught by Wang. As Dr. Frey stated, DRAMs are primarily used in personal computers (PCs), while SRAMs, which are larger and more expensive, are not used in PCs.

[\*865] Wang's SIMMs were designed to provide compact computer memory with minimum size, low cost, easy repairability, and easy expandability. See '605 patent, col. 2, lines 61-64 ("By using the small D-RAMs and small capacitors, module 30 may have physical dimensions [on] the order of three-quarter inch by three inches while providing large memory capacity."). In contrast, the Allen-Bradley patent relates to a memory circuit for a larger, more costly industrial controller. SRAMs were used by Allen-Bradley because of their intended [\*\*19] industrial environment. According to Dr. Frey, size was not a consideration in the Allen-Bradley work. Thus, there is substantial evidence in the record to support a finding that the Allen-Bradley prior art is not reasonably pertinent and is not analogous.

Toshiba and NEC also argue that Wang stipulated that the Allen-Bradley art is analogous. We disagree. At trial, the parties stipulated that the Texas Instruments 1982 MOS Memory Data Book, the '392 patent, and Allen-Bradley's X9 SIMM were prior art to the '605 and '513 patents, but were not before the examiner during prosecution. When the court asked if "these are the stipulated prior art references[?]," and referred to the Allen-Bradley patent and X9 SIMM among other art, Wang did not stipulate that this art was analogous. Wang acknowledged only that it was prior art, not analogous prior art.

The Allen-Bradley patent and X9 SIMM, not being analogous prior art, thus could not have rendered the claimed subject matter obvious. See *Jurgens*, 927 F.2d at 1559, 18 U.S.P.Q.2D (BNA) at 1036. Since Toshiba and NEC rely principally on the Allen-Bradley art and only point to the Texas Instruments reference [\*\*20] in combination with Allen-Bradley, appellants have failed to show that the claimed subject matter would have been obvious to a person having ordinary skill in the art at the time Wang's inventions were made. n9

n9 Even if the Allen-Bradley art were analogous, there was substantial evidence before the jury of significant differences (e.g., substrate size, type of memory chip (SRAM v. DRAM),

number of terminals, chip packaging, etc.) between what the Allen-Bradley art teaches and the claimed invention. As to the chip packaging, the testimony would support a jury finding that there was no suggestion or incentive to make the necessary combination of Allen-Bradley's ceramic DIP module with the disclosed Texas Instruments plastic leaded chip carrier at the time of the claimed invention. In addition, there was ample evidence presented to the jury as to the commercial success of the claimed invention. With these assumed jury-found factual underpinnings, its determination of nonobviousness must be affirmed as a matter of law.

[\*\*21]

### III. Written Description

NEC n10 argues that the '605 and '513 patents are invalid for failure to comply with the written description requirement of [HN9] 35 U.S.C. § 112, first paragraph, which states that

the specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art . . .

35 U.S.C. § 112 (1988) (emphasis added). [HN10] The standard for determining whether the written description requirement has been met has been stated as follows:

Although [the applicant] does not have to describe exactly the subject matter claimed, . . . the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed. . . . The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter.

*Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563, 19 U.S.P.Q.2D (BNA) 1111, 1116 (Fed. Cir. 1991) [\*\*22] (citations and quotations omitted). [HN11] Whether the written description requirement has been met is a question of fact. *Ralston Purina Co. v. Far-Mar-Co, Inc.*, 772 F.2d 1570, 1575, 227 U.S.P.Q. (BNA) 177, 179 (Fed. Cir. 1985). Thus, we must determine whether substantial evidence supports the verdict that the written description requirement was met.

n10 Toshiba does not raise this issue on appeal.

According to NEC, the recitation of "support means for supporting the memory module [\*866] at an angle with respect to the printed circuit motherboard" was not supported by the original Clayton application, and therefore the claims in both patents are invalid. NEC notes that "support means" was not recited in the original claims, but was added by amendment. It alleges that the specification describes the leads of the memory modules as having only an electrical function, not a mechanical, support function.

[HN12] A patent specification is directed to one of ordinary skill in the art. *In re Hayes Microcomputer Prods., Inc. Patent Litigation*, 982 F.2d 1527, 1533, 25 U.S.P.Q.2D (BNA) 1241, 1245 (Fed. Cir. 1992). [\*23] It is also clear that "drawings [HN13] alone may provide a 'written description' of an invention as required by § 112." *Vas-Cath*, 935 F.2d at 1565, 19 U.S.P.Q.2D (BNA) at 1118. Dr. Frey testified that Figure 2 "show[s] terminals as leads, which are means of supporting the module." Additionally, Dr. Frey stated, when discussing whether leadless SIMMs are disclosed in the patents, that a person of ordinary skill in the art would know that a leadless SIMM includes a row of terminals "to mount and support that module." He went on to state that "it's the edge of the card and the terminals that support the module." The inventor, Mr. Clayton, also testified that on leaded SIMMs, the leads themselves are the support means, and that on leadless SIMMs, the bottom row of terminals constitutes the support means. Thus, there is substantial evidence in the record to support the conclusion that the support means element is adequately described in the specification by the disclosure of both leads and the terminal edge of the modules. NEC has not shown that the district court's denial of JNOV on the issue of failure to meet the written description requirement was incorrect.

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#### IV. Infringement

##### A. Lateral and 3-Pack Memory Modules

Toshiba and NEC both appeal that part of the judgment finding infringement under the doctrine of equivalents by the sale of their lateral and 3-pack memory modules. Toshiba argues that prosecution history estoppel bars application of the doctrine. Specifically, Toshiba argues that the 3-pack modules have three memory chips rather than nine, and the lateral modules do not have memory chips mounted only in a single row. They assert that both of these claim limitations were added to overcome rejections based on

prior art. Accordingly, Toshiba argues, Wang is now estopped from claim scope given up during prosecution.

Although Toshiba asserts that prosecution history estoppel applies to both its lateral and its 3-pack memory modules, NEC only raises estoppel with respect to its 3-pack modules and argues that its lateral modules do not infringe Wang's claims because they are leadless. [HN14] Normally an issue not raised by an appellant in its initial brief is waived. However, "this practice is . . . not governed by a rigid rule but may as a matter of discretion not be adhered to where circumstances indicate that it would result in basically [\*25] unfair procedure." *Becton Dickinson & Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 800, 17 U.S.P.Q.2D (BNA) 1097, 1103 (Fed. Cir. 1990). In this case, we can hardly give one appellant the benefit of an estoppel without giving it to the other, so we consider the defense of prosecution history estoppel as applicable to both Toshiba and NEC for both the 3-pack and lateral modules. Wang is not prejudiced by this because it was afforded the opportunity at trial and on appeal to address the issue with respect to the lateral modules. See *Singleton v. Wulff*, 428 U.S. 106, 120, 49 L. Ed. 2d 826, 96 S. Ct. 2868 (1976). Moreover, in this case both parties relied on an estoppel defense at trial.

[HN15] Prosecution history estoppel bars "a patentee from enforcing its claims against otherwise legally equivalent structures if those structures were excluded by claim limitations added in order to avoid prior art." *Mannesmann Demag Corp. v. Engineered Metal Prods. Co.*, 793 F.2d 1279, 1284, 230 U.S.P.Q. (BNA) 45, 48 (Fed. Cir. 1986) (citations omitted). "In [HN16] determining whether prosecution history estoppel applies because of a change in claim language [\*26] during prosecution, the court must consider not only what was changed, but the reason for such change." *Vaupel Textilmaschinen KG v. Meccanica Euro Italia S.P.A.*, 944 F.2d 870, 882, 20 [\*867] U.S.P.Q.2D (BNA) 1045, 1054 (Fed. Cir. 1991) (citing *Sun Studs, Inc. v. ATA Equip. Leasing, Inc.*, 872 F.2d 978, 987, 10 U.S.P.Q.2D (BNA) 1338, 1345 (Fed. Cir. 1989)). [HN17] Whether estoppel applies is a question of law. *LaBounty Mfg., Inc. v. United States Int'l Trade Comm'n*, 867 F.2d 1572, 1576, 9 U.S.P.Q.2D (BNA) 1995, 1998 (Fed. Cir. 1989).

Toshiba asserts that Wang specifically limited the scope of its claims to nine memory chips contained in a single row in order to overcome prior art and that Wang is precluded from recapturing what it gave up during prosecution. "Unmistakable [HN18] assertions made by the applicant to the Patent and Trademark Office (PTO) in support of patentability, whether or not required to secure allowance of the claim, also may operate to preclude the patentee from asserting equivalency . . . ."

*Texas Instruments Inc. v. United States Int'l Trade Comm'n*, 988 F.2d 1165 [\*\*27], 26 U.S.P.Q.2D (BNA) 1018, 1025 (Fed. Cir. 1993) (citations omitted). "Depending on the nature and purpose of an amendment, it may have a limiting effect within a spectrum ranging from great to small to zero." *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1363, 219 U.S.P.Q. (BNA) 473, 481 (Fed. Cir. 1983). [HN19] The prosecution history must be examined as a whole in determining whether estoppel applies. *Texas Instruments*, F.2d at 1165, 26 U.S.P.Q.2D (BNA) at 1025.

In the first Office Action in Wang's parent application, all the claims were rejected under 35 U.S.C. § 103 as unpatentable over U.S. Patent 3,972,033 to Cislighi, who teaches a memory module with multiple rows of nine chips. In Cislighi the check bit, the ninth chip, is located on a separate module from the other eight bits. In response to the rejection, Wang replaced the filed claims so that they recited a printed circuit board substrate for mounting a plurality of memory chips in a single row. Wang stated:

The concept of applicant's invention lies in an improved memory module for installation on a printed circuit [\*\*28] memory board. A single row of RAM memory chips, packaged in the plastic leaded chip carriers, is mounted on a printed circuit board (glass-epoxy) substrate. . . .

Cislighi et al. discloses a memory consisting of two "submodule" printed circuit cards wherein check bits for the first card are contained on the second card and vice versa. Applicant's invention as presently claimed has little in common with the disclosure of Cislighi. . . . Cislighi [does not] have memory chips mounted in a single row. . . .

(Emphasis added).

n11 Wang argued that the '513 claims were patentable for the same reasons that the '605 patent claim was allowed. Thus, we address the prosecution history of the parent application to determine whether estoppel applies to both patents.

Thus, Wang added claims which recited "mounting said plurality of memory chips thereon in a single row." (Emphasis added). The limitation of mounting chips "in a single row" was a basis for overcoming the Examiner's rejection based on Cislighi. [\*\*29] Unlike the teaching

of Cislighi, Wang asserted that its invention accommodated the size constraints of its memory module, noting "the purpose of applicant's invention is to conserve space on a memory board." The "single row" limitation was clearly made for the purpose of overcoming the prior art.

After a second Office Action, Wang filed a preliminary amendment in a file wrapper continuation application in which it cancelled its previous claims and added a new claim, reciting "an epoxy-glass printed circuit board substrate having a length and width adequate for mounting thereon only in a single row said nine memory chips." (Emphasis added). In the "Remarks" section accompanying the preliminary amendment, Wang stated that "Cislighi et al. teaches the advantage of locating a parity chip on a different printed circuit board . . . ." Once again, these limitations were added to overcome the Examiner's rejection based on Cislighi.

Wang argues that the prosecution history does not exclude a substrate having memory chips mounted in two rows, but that the prior art only restricts the size of the substrate to one no larger than that on which nine DRAMs can be mounted. While a two-row construction [\*\*30] may not read on the prior art, Wang limited the scope of its claims to memory chips mounted "only in a single row," and [\*\*868] twice argued before the PTO that Cislighi did not have memory chips mounted in a single row. Although Cislighi taught the advantage of locating a parity chip on a separate module, Wang did not limit its claims to a single module. Instead, it chose a single row, which excludes the accused modules of Toshiba and NEC. Wang chose to emphasize the specific dimensions of the printed circuit board taught by the invention and limited itself to exclude any embodiment in which the memory chips are not physically located in a single row. See *Litton Sys., Inc. v. Whirlpool Corp.*, 728 F.2d 1423, 1439, 221 U.S.P.Q. (BNA) 97, 107 (Fed. Cir. 1984) ("A patent attorney is often faced with choices during a patent prosecution. . . . A patent attorney should not be able, however, to choose one course of action within the PTO with the anticipation that, if later checked, he or she can always choose an alternate course of prosecution in a trial before a federal judge."). Thus, the court erred in denying JNOV; prosecution history estoppel should have [\*\*31] been applied to reach the conclusion that the accused lateral memory modules were surrendered during prosecution and therefore do not infringe under the doctrine of equivalents.

Likewise, Wang is also estopped from now arguing that the 3-pack memory modules having less than nine chips can infringe its claims. In the second Office Action, independent claim 4 was rejected under 35 U.S.C. § 103 as unpatentable over a publication by

Electronic Designs Inc. (EDI) in view of an article by Lowe. The Examiner stated that the EDI publication showed all the elements of the recited claims except the use of PLCCs and that this technique was shown in Lowe. The EDI publication disclosed a memory module having eight chips and decoupling capacitors in which the module was leaded.

In response, Wang replaced its claims which recited "a plurality of data memory chips" with a new claim reciting "eight data memory chips" and "a ninth memory chip for storing error detection and correction information." In the "Remarks" section of its amendment, Wang argued that the EDI publication described "a single in-line memory module which consists of eight ceramic chips . . . [\*\*32] . . . Applicant claims a single in-line memory module comprising nine memory chips (eight for data, one for parity) . . . ." (Emphasis added). Wang also argued that "Cislaghi et al. is opposite to the teaching of the present invention, which claims . . . a ninth memory chip . . . ." (Emphasis added).

Wang now argues that the prosecution history does not exclude use of three memory chips which function equivalently to nine memory chips. However, Wang limited the scope of its claims to nine chips. During prosecution, Wang distinguished the EDI publication, which taught the use of eight chips, by adding a claim reciting exactly nine chips. Wang is thus precluded from obtaining the benefit of the doctrine of equivalents for 3-pack memory modules. The court accordingly erred in denying JNOV as to that issue.

We therefore reverse that part of the court's judgment finding infringement by equivalence as applied to the lateral and 3-pack memory modules. Since the same estoppel exists with respect to both the '605 and '513 patents, our ruling applies to both patents.

#### B. Classic, Leadless Memory Modules

NEC also appeals the denial of JNOV respecting the jury's verdict that NEC's leadless [\*\*33] memory modules infringe the patents in suit. n12 NEC argues generally that none of its leadless modules infringes literally or under the doctrine of equivalents. NEC specifically states that the claims require a "support means" to hold the module at an angle to the motherboard and that the jury misconstrued the claims in finding that NEC's leadless modules infringe.

In response, Wang states that the sufficiency of the evidence underlying the district court's denial of JNOV on this issue is unreviewable on appeal since NEC failed to move for directed verdict on this ground. n13 NEC [\*\*869] responds that it did move for summary judgment. We agree with Wang. [HN20] Although it is true that

the standard for summary judgment is virtually the same as that for a directed verdict, viz., that "there can be but one reasonable conclusion as to the verdict," *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 250, 91 L. Ed. 2d 202, 106 S. Ct. 2505 (1986) (citation omitted), this does not mean that a motion for summary judgment is a substitute for a motion for directed verdict. Rule 50(b) of the *Federal Rules of Civil Procedure* requires a motion for a directed verdict as a prerequisite to a motion for JNOV. A motion [\*\*34] for summary judgment before trial is not a substitute for a motion for directed verdict at the close of all the evidence.

n12 Toshiba does not appeal the judgment on this basis.

n13 Under amended Rule 50, *Fed. R. Civ. P.* 50 now refers to a directed verdict as a judgment as a matter of law. We use the former terminology here.

NEC also asserts that on an issue of claim construction we need not review the sufficiency of the evidence, but can decide as a matter of law whether a leadless memory module can satisfy the support means element of the claims. We disagree. What is involved here are factual questions, not questions of law. As discussed earlier, the leads on the leadless SIMMs are in fact disclosed as support means in the specification. Whether leadless memory modules infringe the claims in issue is also a question of fact. See *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 975, 226 U.S.P.Q. (BNA) 5, 8 (*Fed. Cir.* 1985) (citing *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1575, 225 U.S.P.Q. (BNA) 236, 239 (*Fed. Cir.* 1985)). [\*\*35] Since NEC did not raise this factual issue in a timely manner, we are precluded from reviewing the sufficiency of the evidence supporting the jury's conclusion. This result also applies to both patents asserted and to arguments of literal infringement and the doctrine of equivalents.

#### V. Damages

The district court awarded damages to Wang based on a stipulated total of infringing sales and a reasonable royalty rate of 2.75%, assuming hypothetical royalty negotiations to have occurred in January 1990, the date Wang gave notice to Toshiba and NEC that their products infringed Wang's patents, rather than in April 1987, when the '605 patent issued. The district court stated that January 1990

is chosen because plaintiff is not entitled to any royalty damages prior to that date and because it is the date on which the

parties actually would have engaged in negotiations over a reasonable royalty, had both sides been willing to do so. Hence, selection of this date best approximates the royalty that would have resulted had the defendants chosen to seek a patent license rather than to continue unlicensed production and risk being found to have infringed the patents. Nor is there any solid [\*\*36] policy reason supporting selection of the earlier date, the date on which the patents issued and infringement of the invention technically began, but for which plaintiffs are barred by 35 U.S.C. § 287 from seeking damages.

Slip op. at 3.

Wang cross-appeals the district court's selection of the January 1990 date as the date when hypothetical negotiations were presumed to have occurred. Wang argues that negotiations should have been hypothesized at the start of infringement, i.e., when both a patent had issued and accused products were sold. We agree.

In reviewing the district court's award, we must determine if the court abused its discretion in its methodology for determining a reasonable royalty rate. *SmithKline Diagnostics, Inc. v. Helena Lab. Corp.*, 926 F.2d 1161, 1164, 17 U.S.P.Q.2D (BNA) 1922, 1925 (Fed. Cir. 1991). [HN21] An abuse of discretion occurs when a court bases its determination "on clearly erroneous factual findings, legal error, or a manifest error of judgment." *Datascope Corp. v. SMEC, Inc.*, 879 F.2d 820, 823-24, 11 U.S.P.Q.2D (BNA) 1321, 1323 (Fed. Cir. 1989), [\*\*37] cert. denied, 493 U.S. 1024, 107 L. Ed. 2d 747, 110 S. Ct. 729 (1990) (citation omitted). We conclude that the district court committed legal error in choosing January 1990 as the date when hypothetical negotiations began and therefore that it abused its discretion by denying Wang's motion to [\*\*870] amend the judgment as to the reasonable royalty rate.

Under [HN22] 35 U.S.C. § 284 (1988),

the court shall award the claimant damages adequate to compensate for the infringement but in no event less than a reasonable royalty for the use made of the invention by the infringer . . . .

[HN23] When actual damages cannot be adequately proved, a reasonable royalty may be employed. *Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1574, 7 U.S.P.Q.2D (BNA) 1606, 1612 (Fed. Cir. 1988). "A reasonable royalty is the amount that 'a person,

desiring to manufacture [, use, or] sell a patented article, as a business proposition, would be willing to pay as a royalty and yet be able to make [, use, or] sell the patented article, in the market, at a reasonable profit.'" *Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.*, 750 F.2d 1552, 1568, 224 U.S.P.Q. (BNA) 259, 269 (Fed. Cir. 1984) [\*\*38] (alterations in original; citations omitted). [HN24] When an established royalty does not exist, a court may determine a reasonable royalty based on "hypothetical negotiations between willing licensor and willing licensee." *Fromson*, 853 F.2d at 1574, 7 U.S.P.Q.2D (BNA) at 1612. "The key element in setting a reasonable royalty . . . is the necessity for return to the date when the infringement began." *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1079, 219 U.S.P.Q. (BNA) 679, 682 (Fed. Cir. 1983) (quoting *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1158, 197 U.S.P.Q. (BNA) 726, 731 (6th Cir. 1978)); see also *Fromson*, 853 F.2d at 1575, 7 U.S.P.Q.2D (BNA) at 1613 (hypothetical royalty negotiations methodology "speaks of negotiations as of the time infringement began").

In choosing the January 1990 date, the district court failed to follow our precedent. It is not illogical to hypothesize a negotiation at the time of notice. After all, an accused infringer may not know of the patents until notice is given. Nonetheless, this [\*\*39] case is governed by the rule in *Fromson*, in which hypothetical negotiations were determined to have occurred when the infringement began, which was the date the patent issued, even though, under 35 U.S.C. § 286, the infringer was only liable for damages for the six years prior to the filing of the infringement action. In this case, infringing products were being sold on the date of issuance of the '605 patent. Therefore, under *Fromson*, hypothetical royalty negotiations should have been considered to have occurred on the patent issuance date. It is true that limitations may apply to the period for which damages may be recovered. As in the present case, [HN25] failure to mark patented goods is a limitation on recovery of damages, in the absence of notice. 35 U.S.C. § 287 (1988). However, the court confused limitation on damages due to lack of notice with determination of the time when damages first began to accrue, and it is the latter which is controlling in a hypothetical royalty determination. Thus, the district court abused its discretion by denying Wang's motion to amend the judgment as to the reasonable royalty [\*\*40] rate.

#### CONCLUSION

We reverse the district court's judgment denying NEC's and Toshiba's joint motion for JNOV on the issue of infringement by NEC's and Toshiba's sale of lateral and 3-pack memory modules under the doctrine of equivalents. We reverse the court's judgment awarding

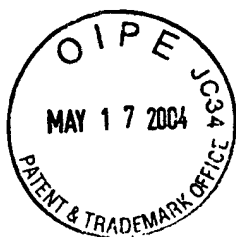
993 F.2d 858, \*, 1993 U.S. App. LEXIS 10913, \*\*;  
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damages at a 2.75% royalty rate, and we remand for a determination of damages at a 4.0% royalty rate. We affirm the judgment in all other respects.

COSTS

Each party is to bear its own costs.

AFFIRMED-IN-PART, REVERSED-IN-PART,  
AND REMANDED-IN-PART



LEXSEE 977 F2D 1443

IN RE HANS OETIKER

91-1026

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

977 F.2d 1443; 1992 U.S. App. LEXIS 25784; 24 U.S.P.Q.2D (BNA) 1443; 93  
Daily Journal DAR 658

October 13, 1992, Decided

**PRIOR HISTORY:** [\*\*1] Appealed from: U.S. Patent & Trademark Office Board of Patent Appeals & Interferences

**DISPOSITION:** REVERSED.

**CASE SUMMARY:**

**PROCEDURAL POSTURE:** Appellant sought review of the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences, which held that all of the claims in patent application were unpatentable under 35 U.S.C.S. § 103.

**OVERVIEW:** The United States Patent and Trademark Office Board of Patent Appeals and Interferences (Board) denied appellant's application for a patent on an improvement to a metal hose clamp, generally described in an earlier patent already belonging to appellant. Appellant contended that the improvement described as a pre-assembly hook, served both to maintain pre-assembly condition of clamp, and to disengage automatically when clamp was tightened. The Board stated in its brief on appeal that a disengageable catch, such as that used by appellant, was a common everyday mechanical concept that was employed in door latches, and electrical and other switches. However, the Commissioner failed to cite any references. While judicial notice of common everyday mechanical concepts could have been taken in appropriate circumstances, the Commissioner did not explain why a 'catch' of unstated structure in an electrical switch, for example, was such a concept, and would have made appellant's invention obvious.

**OUTCOME:** The court found no procedural errors; however, the Commissioner of the Board did not explain its reasoning in holding the appellant's claims obvious due to common everyday mechanical concepts. Therefore, the references upon which the Board relied were improperly combined and the rejection of appellant's claims was reversed.

**CORE TERMS:** examiner, invention, prima facie case, patent, obviousness, teaching, prima facie, skill, clamp, combined, garment, chemical, inventor, patentability, motivation, combine, burden of persuasion, reconsideration, solve, initial burden, new evidence, mechanical, hook and eye, unpatentable, fastener, artisan, hook, hose, preponderance of evidence, rebuttal evidence

**LexisNexis (TM) HEADNOTES - Core Concepts:**

*Patent Law > U.S. Patent & Trademark Office  
Prosecution Procedures > Appeals*

[HN1] When the U.S. Patent & Trademark Office Board of Patent Appeals and Interference makes a new rejection of an appealed claim, the appellant may exercise either of the following two options: (1) The appellant may submit a showing of facts and have the matter reconsidered by the examiner in which event the application will be remanded to the examiner; or (2) The appellant may have the case reconsidered under § 1.197(b), by the Board upon the same record. 37 C.F.R. § 1.196(b).

*Patent Law > U.S. Patent & Trademark Office  
Prosecution Procedures > Examination of Applications*

[HN2] The prima facie case is a procedural tool of patent examination, allocating the burdens of going forward as between examiner and applicant. The term 'prima facie case' refers only to the initial examination step. The examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant. After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.

**Patent Law > U.S. Patent & Trademark Office Prosecution Procedures > Examination of Applications**

[HN3] If examination at the initial stage of patent examination does not produce a prima facie case of unpatentability, then without more the applicant is entitled to grant of the patent.

**COUNSEL:** Paul M. Craig, Jr., of Washington, D.C., argued for appellant.

John W. Dewhirst, Office of the Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief were Fred E. McKelvey, Solicitor and Robert d. Edmonds, Associate Solicitor.

**JUDGES:** Before NIES, Chief Judge, NEWMAN and PLAGER, Circuit Judges.

**OPINIONBY:** NEWMAN

**OPINION:** [\*1444]

NEWMAN, Circuit Judge.

Hans Oetiker appeals the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences, holding unpatentable claims 1-14 and 16-21, all of the claims in patent application No. 06/942,694. n1 Oetiker appeals on procedural and substantive grounds.

n1 Ex parte Oetiker, No. 89-2230 (Bd. Pat. App. & Interf. May 31, 1990; on reconsideration, August 23, 1990).

I

**PROCEDURE**

**Background**

All of the claims were finally rejected for obviousness in terms of 35 U.S.C. § 103. The Board,

upholding the rejection, stated that "the [\*\*2] examiner has . . . established a prima facie case of obviousness . . . which is un rebutted by any objective evidence of nonobviousness". Oetiker stated that this Board holding was the first rejection of his claims for being "prima facie obvious", and filed rebuttal evidence with a petition for reconsideration. The Board declined to consider the new evidence or change its decision.

Oetiker states that a holding of prima facie obviousness means, in patent examination, that the claimed invention is subject [\*1445] to a rebuttable presumption of obviousness; that is, if the applicant can provide evidence or argument in support of unobviousness, such evidence and argument will be considered, and the question of patentability will be redetermined on the entire record. Oetiker states that a rejection made in the words "prima facie obvious" is understood by patent examiners and practitioners as an invitation to provide such rebuttal evidence.

Thus Oetiker argues that a holding by the Board of prima facie obviousness is a new ground of rejection, for during prosecution the examiner did not reject the claims in these words. Treating it as such, Oetiker offered affidavit evidence not [\*\*3] previously filed, and requested reconsideration on the basis of this new evidence, or remand to the examiner for this purpose, in accordance with 37 C.F.R. § 1.196(b):

§ [HN1] 1.196(b) . . . When the Board . . . makes a new rejection of an appealed claim, the appellant may exercise either of the following two options . . . :

(1) The appellant may submit . . . a showing of facts . . . and have the matter reconsidered by the examiner in which event the application will be remanded to the examiner . . . .

(2) The appellant may have the case reconsidered under § 1.197(b) by the Board upon the same record.

The Board on reconsideration granted neither of the options of § 1.196(b), stating that it had not made a new rejection.

At argument before this court the Commissioner's counsel suggested that Oetiker could refile his patent application, pay a new fee, and obtain review of this new evidence in a new examination. Oetiker states that he was entitled to a complete examination, and did not get it.

**Discussion**

[HN2] The prima facie case is a procedural tool of patent examination, allocating the burdens of going forward as between examiner and applicant. *In re*



977 F.2d 1443, \*, 1992 U.S. App. LEXIS 25784, \*\*;  
24 U.S.P.Q.2D (BNA) 1443; 93 Daily Journal DAR 658

*Spada*, 911 F.2d 705, 707 n.3, 15 USPQ2d 1655, 1657 n.3 (Fed. Cir. 1990). [\*\*4] The term "prima facie case" refers only to the initial examination step. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); *In re Rinehart*, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). As discussed in *In re Piasecki*, the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.

After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument. See *In re Spada*, *supra*; *In re Corkill*, 771 F.2d 1496, 1500, 226 USPQ 1005, 1008 (Fed. Cir. 1985); *In re Caveny*, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985); *In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984). [\*\*5]

[HN3] If examination at the initial stage does not produce a prima facie case of unpatentability, then without more the applicant is entitled to grant of the patent. See *In re Grabiak*, 769 F.2d 729, 733, 226 USPQ 870, 873 (Fed. Cir. 1985); *In re Rinehart*, *supra*.

In reviewing the examiner's decision on appeal, the Board must necessarily weigh all of the evidence and argument. An observation by the Board that the examiner made a prima facie case is not improper, as long as the ultimate determination of patentability is made on the entire record. *In re Piasecki*, 745 F.2d at 1472, 223 USPQ at 788; *In re Rinehart*, 531 F.2d at 1052, 189 USPQ at 147.

The record here reveals that the application was fully prosecuted. References were cited and applied by the examiner, the applicant responded with argument, and the examiner then issued a final rejection, stating why he was not persuaded by the applicant's argument. On review the Board stated that its decision was reached "after careful consideration of the [\*\*6] appealed claims, the evidence of obviousness relied upon by the examiner and the arguments advanced by the appellant and the examiner". The Board explained why it was unpersuaded [\*1446] by Oetiker's arguments on appeal. We discern no irregularity in the procedure. The Board, in explaining that the examiner's rejections constituted a prima facie case of obviousness, did not make a new rejection.

Oetiker also argues that the concept of a "prima facie case of obviousness" has no role outside of the chemical arts. Oetiker refers to the origins of this term in the chemical practice, where properties may not be apparent from chemical structure. Oetiker distinguishes

mechanical inventions, where the properties and workings of a mechanical device are apparent in the drawing of the structure. We think that the PTO is correct in treating the concept of the prima facie case as of broad applicability, for it places the initial burden on the examiner, the appropriate procedure whatever the technological class of invention. That a prima facie case may be established, or rebutted, by different forms of evidence in various technologies does not restrict the concept to any particular field [\*\*7] of technology. "The requirement of unobviousness in the case of chemical inventions is the same as for other types of inventions". *In re Johnson*, 747 F.2d at 1460, 223 USPQ at 1263. This procedural tool is recognized in fields outside of the chemical arts. E.g., *In re Benno*, 768 F.2d 1340, 226 USPQ 683 (Fed. Cir. 1985); *In re McCarthy*, 763 F.2d 411, 226 USPQ 99 (Fed. Cir. 1985); *In re De Blauwe*, 736 F.2d 699, 222 USPQ 191 (Fed. Cir. 1984).

The Board's usage of the term prima facie was imprecise for, as discussed *supra*, the term "prima facie obvious" relates to the burden on the examiner at the initial stage of the examination, while the conclusion of obviousness *vel non* is based on the preponderance of evidence and argument in the record. However, it was clear that the Board did not make a new rejection. Therefore the Board did not err in declining to consider at that stage the proffered evidence of commercial success.

## II

### THE MERITS

Oetiker's invention is an improvement in a "stepless, [\*\*8] earless" metal clamp, a hose clamp that was generally described in an earlier '004 patent of Oetiker, but that differs in the presence of a feature that is described as a preassembly "hook". This "hook" serves both to maintain the preassembly condition of the clamp and to be disengaged automatically when the clamp is tightened.

The cited references were Oetiker's earlier-granted '004 patent, combined with a certain Lauro '400 patent. Lauro describes a plastic hook and eye fastener for use in garments, in which "unitary tabs of sewing needle puncturable plastic material . . . are affixable to clothing and the like by sewing". Oetiker argues that there is no suggestion or motivation to the artisan to combine the teachings of the cited references, and that Lauro is nonanalogous art. Oetiker concludes that these references were improperly combined; that a person of ordinary skill, seeking to solve the problem facing Oetiker, would not look to the garment art for the solution. Oetiker also argues that even if combined the references do not render the claimed combination obvious.

977 F.2d 1443, \*; 1992 U.S. App. LEXIS 25784, \*\*;  
24 U.S.P.Q.2D (BNA) 1443; 93 Daily Journal DAR 658

The examiner stated that "since garments commonly use hooks for securement", a person faced with the problem [\*\*9] of unreliable maintenance of the pre-assembly configuration of an assembly line metal hose clamp would look to the garment industry art. The examiner explained further by stating that "Appellant's device as disclosed could be utilized as part of a garment". The Board did not repeat or support the examiner's argument, or discuss its relevance. Indeed, the argument is not supportable. However, the Board held that the Lauro reference, although not "within the appellant's specific field of endeavor" is nonetheless "analogous art" because it relates to a hooking problem, as does Oetiker's invention.

The Board apparently reasoned that all hooking problems are analogous. At least, that is the argument now pressed by the Commissioner. The Commissioner states in his brief on appeal that "A disengageable [\*1447] catch, such as that used by Oetiker, is a common everyday mechanical concept that is variously employed in door latches and electrical and other switches, as well as in the hook and eye apparatus disclosed by Lauro". No such references were cited, however. While this court may take judicial notice of common everyday mechanical concepts in appropriate circumstances, the Commissioner did not [\*\*10] explain why a "catch" of unstated structure in an electrical switch, for example, is such a concept and would have made Oetiker's invention obvious. Indeed, the Commissioner did not respond to Oetiker's argument that the cited references provide no teaching or suggestion that Lauro's molded hook and eye fastener, even if combined with Oetiker's '004 clamp, would achieve Oetiker's purpose.

In order to rely on a reference as a basis for rejection of the applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. See *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986). Patent examination is necessarily conducted by hindsight, with complete knowledge of the applicant's invention, and the courts have recognized the subjective aspects of determining whether an inventor would reasonably be motivated to go to the field in which the examiner found the reference, in order to solve the problem confronting the inventor. We have reminded ourselves and the PTO that it is necessary to consider "the [\*\*11] reality of the circumstances", *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979) -- in other words, common sense -- in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor.

It has not been shown that a person of ordinary skill, seeking to solve a problem of fastening a hose clamp, would reasonably be expected or motivated to look to fasteners for garments. The combination of elements from nonanalogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a prima facie case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself. *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 678-79, 7 USPQ2d 1315, 1318 (Fed. Cir. 1988); *In re Geiger*, 815 F.2d 686, 687, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987); [\*\*12] *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1147, 227 USPQ 543, 551 (Fed. Cir. 1985).

Oetiker's invention is simple. Simplicity is not inimical to patentability. See *Goodyear Tire & Rubber Co. v. Ray-O-Vac Co.*, 321 U.S. 275, 279, 60 USPQ 386, 388 (1944) (simplicity of itself does not negative invention); *Panduit Corp. v. Dennison Mfg Co.*, 810 F.2d 1561, 1572, 1 USPQ2d 1593, 1600 (Fed. Cir.) (the patent system is not foreclosed to those who make simple inventions), cert. denied, 481 U.S. 1052 (1987).

We conclude that the references on which the Board relied were improperly combined. Accordingly, the Board erred in holding the claims unpatentable under section 103. The rejection of claims 1-4 and 16-21 is

REVERSED.

CONCURBY: NIES; PLAGER

CONCUR:

NIES, Chief Judge, concurring.

I agree with the panel decision and write only to express my understanding of the language that there must be some teaching, reason, suggestion, or motivation found "in the prior art" or "in the prior art references" to make [\*\*13] a combination to render an invention obvious within the meaning of 35 U.S.C. § 103 (1988). Similar language appears in a number of opinions n1 [\*\*1448] and if taken literally would mean that an invention cannot be held to have been obvious unless something specific in a prior art reference would lead an inventor to combine the teachings therein with another piece of prior art.

n1 See, e.g., *Symbol Technologies, Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1576, 19 USPQ2d 1241, 1246 (Fed. Cir. 1991); *In re Gorman*, 933

977 F.2d 1443, \*; 1992 U.S. App. LEXIS 25784, \*\*;  
24 U.S.P.Q.2D (BNA) 1443; 93 Daily Journal DAR 658

*F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991); In re Mills, 916 F.2d 680, 682, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990); Smithkline Diagnostics, Inc. v. Helena Laboratories Corp., 859 F.2d 878, 887, 8 USPQ2d 1468, 1475 (Fed. Cir. 1988); In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988); In re Stencel, 828 F.2d 751, 755, 4 USPQ2d 1071, 1073 (Fed. Cir. 1987); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); In re Grabiak, 769 F.2d 729, 732, 226 USPQ 870, 872 (Fed. Cir. 1985).*

**[\*\*14]**

This restrictive understanding of the concept of obviousness is clearly wrong. Other statements in opinions express the idea more generally. We have stated, for example, that the test is: "whether the teachings of the prior art, taken as a whole, would have made obvious the claimed invention," *In re Gorman*, 933 F.2d at 986, 18 USPQ2d at 1888, and "what the combined teachings . . . would have suggested to one of ordinary skill in the art," *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991). We have also stated that "the prior art as a whole must suggest the desirability . . . of making the combination." *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984).

I believe that it would better reflect the concept of obviousness to speak in terms of "from the [**\*\*15**] prior art" rather than simply "in the prior art." The word "from" expresses the idea of the statute that we must look at the obviousness issue through the eyes of one of ordinary skill in the art and what one would be presumed to know with that background. What would be obvious to one of skill in the art is a different question from what would be obvious to a layman. An artisan is likely to extract more than a layman from reading a reference.

In any event, variance in the language used in opinions does not change the nature of the statutory inquiry. Under section 103, subject matter is unpatentable if it "would have been obvious . . . to a person having ordinary skill in the art." While there must be some teaching, reason, suggestion, or motivation to combine existing elements to produce the claimed device, it is not necessary that the cited references or prior art specifically suggest making the combination. *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988). Such suggestion or motivation to

combine prior art teachings can derive solely from the existence of a teaching, which one of ordinary [**\*\*16**] skill in the art would be presumed to know, and the use of that teaching to solve the same or similar problem which it addresses. *In re Wood*, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (CCPA 1979). See, also, *EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 906-07, 225 USPQ 20, 25 (Fed. Cir.), cert. denied, 474 U.S. 843 (1985); *In re Sernaker*, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). See also, *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985) ("To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.").

In sum, it is off the mark for litigants to argue, as many do, that an invention cannot be held to have been obvious unless a suggestion to combine prior art [**\*\*17**] teachings is found in a specific reference.

PLAGER, *Circuit Judge*, concurring.

I join in the carefully-reasoned and well-written opinion of Judge Newman. With regard to Part I dealing with the PTO procedure, her explanation of the meaning and application of the 'prima facie case' concept should help clarify an area that remains marked by a lack of clarity. The [**\*1449**] need for that discussion, however, illustrates the pitfalls of the 'prima facie' practice of the PTO, and the difficulties created by this particular legalistically convoluted concept.

An applicant for a patent is entitled to the patent unless the application fails to meet the requirements established by law. It is the Commissioner's duty (acting through the examining officials) to determine that all requirements of the Patent Act are met. The burden is on the Commissioner to establish that the applicant is not entitled under the law to a patent. *In re Warner*, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967), cert. denied 389 U.S. 1057 (1968). In rejecting an application, factual determinations by the PTO must be based on a preponderance of [**\*\*18**] the evidence, and legal conclusions must be correct. *In re Caveney*, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985).

The process of patent examination is an interactive one. See generally, *Chisum, Patents*, § 11.03 et seq. (1992). The examiner cannot sit mum, leaving the applicant to shoot arrows into the dark hoping to somehow hit a secret objection harbored by the examiner. The 'prima facie case' notion, the exact origin of which appears obscure (see *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984)),

seemingly was intended to leave no doubt among examiners that they must state clearly and specifically any objections (the prima facie case) to patentability, and give the applicant fair opportunity to meet those objections with evidence and argument. To that extent the concept serves to level the playing field and reduces the likelihood of administrative arbitrariness.

But the ultimate decision that must be made by the PTO in the examination process, and by this court on appeal, is not whether a prima facie case for rejection was made; the only question is [\*\*19] whether, on the whole record, the applicant has met the statutory requirements for obtaining a patent. When a final rejection is described in terms of whether a prima facie case was made, that intermediate issue diverts attention from what should be the question to be decided.

Specifically, when obviousness is at issue, the examiner has the burden of persuasion and therefore the

initial burden of production. Satisfying the burden of production, and thus initially the burden of persuasion, constitutes the so-called prima facie showing. Once that burden is met, the applicant has the burden of production to demonstrate that the examiner's preliminary determination is not correct. The examiner, and if later involved, the Board, retain the ultimate burden of persuasion on the issue.

If, as a matter of law, the issue is in equipoise, the applicant is entitled to the patent. Thus on appeal to this court as in the PTO, the applicant does not bear the ultimate burden of persuasion on the issue. In the end there is no reason there or here to argue over whether a 'prima facie' case was made out. The only determinative issue is whether the record as a whole supports the legal conclusion that [\*\*20] the invention would have been obvious.



LEXSEE 192 F3D 1353

**TEC AIR, INC., Plaintiff-Appellee, v. DENSO MANUFACTURING MICHIGAN INC. (formerly known as Nippondenso Manufacturing USA, Inc.) and DENSO CORPORATION (formerly known as Nippondenso Co., Ltd.), Defendants-Appellants.**

99-1011

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*192 F.3d 1353; 1999 U.S. App. LEXIS 24276; 52 U.S.P.Q.2D (BNA) 1294*

September 30, 1999, Decided

**SUBSEQUENT HISTORY:** [**\*\*1**] Rehearing Denied and Suggestion for Rehearing En Banc Declined November 8, 1999, Reported at: *1999 U.S. App. LEXIS 31491*.

**PRIOR HISTORY:** Appealed from: United States District Court for the Northern District of Illinois. Judge Blanche M. Manning.

**DISPOSITION:** AFFIRMED.

**LexisNexis (TM) HEADNOTES - Core Concepts:**

**COUNSEL:** Jerold A. Jacover, Brinks Hofer Gilson & Lione, of Chicago, Illinois, argued for plaintiff-appellee. With him on the brief were Richard A. Kaplan, Rodney A. Daniel, and Bradley G. Lane. Of counsel was James M. McCarthy.

William A. Streff, Jr., Kirkland & Ellis, of Chicago, Illinois, argued for defendants-appellants. With him on the brief was Paul R. Steadman; and Jay I. Alexander, Kirkland & Ellis, of Washington, DC. Of counsel on the brief were Kenneth J. Jurek and Rosanne J. Faraci, McDermott, Will & Emery, of Chicago, Illinois.

**JUDGES:** Before MAYER, Chief Judge, MICHEL and LOURIE, Circuit Judges.

**OPINIONBY:** MAYER

**OPINION:** [**\*1356**]

MAYER, Chief Judge.

Denso Manufacturing Michigan, Inc. and Denso Corporation (collectively "Denso") appeal the September 24, 1998 judgment of the United States District Court for the Northern District of Illinois, No. 91-CV-4488, which was entered after the court denied Denso's motion for judgment as a matter of law, or alternatively, for a new trial on the issues of patent validity and damages. We affirm.

#### Background

Tec Air, Inc. [**\*\*2**] ("Tec Air") owns U.S. Patent Nos. 4,047,692 and 4,107,257 ("the Swin patents"), both of which have effective filing dates of September 24, 1975. The Swin patents describe a method of and a device for making properly balanced, injected-molded fans. One way to balance a plastic fan is to use balance "pads," "lugs," or "plugs," which are deposits of plastic located in appropriate places on the fan. To create these lugs, a hollow column is formed in a steel fan mold, which fills with molten plastic during the injection-molding process. When Tec Air entered the fan molding business in 1972, like other manufacturers, it used several methods of creating these columns, such as grinding or drilling holes in mold inserts and refilling them if needed. A mold insert forms a portion of the overall fan. Tec Air also inserted replaceable brass rods into hollowed-out sections of the mold insert, which are drilled more easily because brass is a softer metal than steel (the "brass plug method"). In June 1974, Tec Air's employee, Richard Swin, Sr., conceived the method disclosed in the Swin patents--inserting adjustable screws into hollowed-out sections of the mold insert that

is used to form the fan [\*\*3] hub. These screws are accessible from the front or cavity-side of the mold.

Throughout the development of the claimed invention, Tec Air continued to market its fans and fan molds. For example, in June 1974, Tec Air offered to sell Keeprite Products ("Keeprite") injected-molded [\*1357] fans and the corresponding mold. Keeprite placed an order in July 1974 and Tec Air created drawings for the Keeprite fan. One drawing, dated August 16, 1974, shows "balance plugs" on the fan, but does not specify the method of creating them. Before September 24, 1974, Tec Air asked its mold maker, Jack Dearhammer at Mid City Tool & Die, to quote it a price for making a mold insert for the Keeprite fan. The sketch used for this price quotation did not show balance plugs, but Dearhammer ultimately made the mold insert capable of producing balance plugs by inserting adjustable screws into hollowed-out sections of the mold. In another attempt to solicit business, Tec Air sent sample fans to Howard Industries on August 14, 1974. These fans were model number 4B-60-21. On August 13, 1974, Dearhammer returned to Tec Air the mold insert used to make the 4B-60-21 fan, after he had modified it to include the patented [\*\*4] invention's adjustable screws. Prior to sending the mold to Dearhammer, however, Tec Air accumulated thousands of the 4B-60-21 fans in its inventory, which were made by prior art balancing techniques.

In 1991, Tec Air sued Denso for infringement because it manufactured radiator and condenser assemblies that included a fan that was balanced according to the claimed method. Tec Air won the infringement phase of the trifurcated trial, which Denso does not appeal. A jury then heard the invalidity phase of the suit, in which Denso argued that the patents are invalid because Tec Air offered the invention for sale more than one year before the effective filing date and because the invention of the claims would have been obvious. The jury returned special interrogatories indicating that Tec Air neither sold nor offered the invention for sale before the critical date and that the patented invention would not have been obvious. The same jury subsequently awarded damages of \$ 25.2 million, which corresponds to a royalty of 6.5% of the infringing sales of Denso's entire radiator and condenser assemblies, but is nevertheless less than the royalty requested by Tec Air. Denso moved for judgment [\*\*5] as a matter of law, or alternatively, for a new trial on the validity and damages issues.

The court denied the motion for judgment as a matter of law because, although the evidence showed that Tec Air possessed mold inserts having adjustable screws before the critical date, there was evidence that Tec Air did not use these inserts to create commercial

products. In addition, the court determined not only that Denso failed to establish a prima facie case of obviousness for lack of a suggestion to combine the cited references, but also that Tec Air produced sufficient objective evidence of nonobviousness. The court also held that the jury properly used the entire market value rule in measuring damages because each Denso assembly was a single functioning unit, which included the infringing fan. The court then denied Denso's motion for a new trial because the evidence was sufficient to support the invalidity verdict and the damage award was neither excessive nor the product of improper considerations. This appeal followed.

#### Discussion

"We review a trial court's decision on a motion for judgment as a matter of law following a jury verdict by reapplying its own standard of review. [\*\*6] Therefore, for [Denso] to prevail on appeal it must prove that the jury's factual findings were not supported by substantial evidence or that the facts were not sufficient to support the conclusions necessarily drawn by the jury on the way to its verdict." *Applied Med. Resources Corp. v. United States Surgical Corp.*, 147 F.3d 1374, 1376, 47 U.S.P.Q.2D (BNA) 1289, 1290 (Fed. Cir. 1998) (citations omitted). In evaluating whether Denso met this standard, "we must consider the evidence of record in the light most favorable to [Tec Air], drawing all reasonable inferences in its favor, without disturbing the jury's credibility [\*1358] determinations or substituting our resolutions of conflicting evidence for those of the jury." *Id.* at 1376-77, 47 U.S.P.Q.2D (BNA) at 1291. If no reasonable person could have reached a verdict for Tec Air in light of the record before the jury, Denso will prevail. See *id.* at 1376, 47 U.S.P.Q.2D (BNA) at 1291.

#### On-Sale Bar

"The ultimate determination that a product was placed on sale under [ 35 U.S.C. § 102(b) (1994)] is a question of law, based on underlying facts." *Ferag AG v. Quipp Inc.*, 45 F.3d 1562, 1566, 33 U.S.P.Q.2D (BNA) 1512, 1514-15 (Fed. Cir. 1995). [\*\*7] To prove that the Swin patents are invalid for violating the on-sale bar, Denso "must demonstrate by clear and convincing evidence that there was a definite sale or offer to sell more than one year before the application for the subject patent, and that the subject matter of the sale or offer to sell fully anticipated the claimed invention or would have rendered the claimed invention obvious by its addition to the prior art." *Id.* (internal quotations omitted); see also *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 119 S. Ct. 304, 311, 48 U.S.P.Q.2D (BNA) 1641, 1647, 142 L. Ed. 2d 261 (1998) ("First, the product must be the subject of a commercial offer for sale."); *Scaltech Inc. v. Retec/Tetra, L.L.C.*, 178 F.3d 1378, 1383, 51

*U.S.P.Q.2D (BNA) 1055, 1058 (Fed. Cir. 1999)* ("The first determination in the § 102(b) analysis must be whether the subject of the barring activity met each of the limitations of the claim, and thus was an embodiment of the claimed invention."). If this subject matter anticipates the claimed invention or would have rendered it obvious, the invention itself must also have been "ready for patenting" at the time of the offer or sale--e.g., the invention [\*\*8] must have been reduced to practice or embodied in "drawings or other descriptions . . . that [are] sufficiently specific to enable a person skilled in the art to practice the invention." *Pfaff*, 119 S. Ct. at 312, 48 U.S.P.Q.2D (BNA) at 1647.

Denso claims that Tec Air offered the invention for sale on June 26, 1974 to Keeprite and on August 14, 1974 to Howard Industries, both prior to the critical date of September 24, 1974. According to Tec Air, although it ultimately shipped fans made according to the invention to these customers, it did not specify the balancing technique in its offers and it did not intend to use the patented one when it made the offers. Viewing the evidence in the light most favorable to Tec Air, we hold that the jury reasonably could have found that Tec Air's offers to Keeprite and Howard Industries did not raise the on-sale bar because the subject matter of these offers does not fully anticipate the claimed invention and Denso does not argue that it would have rendered the invention obvious.

Denso argues that no reasonable jury could have found that the reference to "balance plugs" on the August 16, 1974 drawing for the Keeprite fan meant anything [\*\*9] other than balance plugs made according to the Swin patents because the mold was ultimately made with adjustable screws. The drawing itself sheds no light on the method of making the fan. To buttress its claim, therefore, Denso cites Dearhammer's testimony that he thought the notation referred to adjustable screws and that Tec Air employees called the adjustable screws "balance plugs." Tec Air's employee Richard Swin, Jr. testified, however, that the plastic lugs formed on the fan blade are called "balance plugs," regardless of the method used to create them. He also testified that Tec Air intended to use the brass plug method to balance the Keeprite fan when it made the August 1974 drawing and did not tell Dearhammer that adjustable screws would be used until October 29, 1974, when it sent him specifications for the first time. Dearhammer admitted that the sketch he used to quote a price for the Keeprite mold did not show adjustable screws. In light of this evidence, the jury reasonably could have found that Tec Air did not offer [\*1359] the patented invention for sale to Keeprite before the critical date.

Denso stresses that the August 1974 drawing shows that the invention was ready for [\*\*10] patenting, thus

satisfying the second prong of *Pfaff*. See 119 S. Ct. at 312, 48 U.S.P.Q.2D (BNA) at 1647. However, because the offer for sale did not involve subject matter that either anticipates the invention or would have rendered it obvious, *Pfaff*'s second prong is irrelevant. *Pfaff* did not remove the requirement that the subject matter of the commercial offer for sale "be something within the scope of the claim." *Scaltech*, 178 F.3d at 1383, 51 U.S.P.Q.2D (BNA) at 1058. Accordingly, Denso's reliance on *Pfaff* does not have the talismanic effect it desires.

Denso also argues that no reasonable jury could have found that the samples sent to Howard Industries with the August 14, 1974 offer letter were not made pursuant to the Swin patents because Tec Air received the modified mold the day before. It also claims that the sent fans must have had balance lugs made according to the patents because Howard Industries sent a letter in January 1975 asking Tec Air to move the "balancing lugs" on the 4B-60-21 fan. Tec Air argues that the jury reasonably could have found that the samples were made before August 13, 1974 because it had thousands of 4B-60-21 fans [\*\*11] in inventory before it sent the mold to Mid City. Swin, Jr. testified that he selected the 4B-60-21 fan mold insert to be modified in part because Tec Air had a sufficient inventory of 4B-60-21 fans that it could ship while he tested the modified mold. Because balance lugs can be formed by several methods, the January 1975 letter does not indisputably show that Tec Air made the sent fans with the modified mold. Swin, Jr. testified, furthermore, that he did not make any fans from the modified mold until September 1974. Denso's argument relies on an inference that Tec Air immediately ran samples from the modified mold, despite Swin, Jr.'s testimony to the contrary. Although Swin, Jr. was an interested witness, the jury could have reasonably believed him in light of the large number of 4B-60-21 fans available in Tec Air's inventory. Therefore, the court did not err in denying Denso's motion for judgment as a matter of law on the issue of validity under section 102(b).

#### Obviousness

"Obviousness under 35 U.S.C. § 103 [(1994)] is a legal conclusion based on factual evidence," which we review "for correctness or error as a matter of law." *In re Fine*, 837 F.2d 1071, 1073, 5 U.S.P.Q.2D (BNA) 1596, 1598 (Fed. Cir. 1988) [\*\*12] (internal quotations omitted). These factual underpinnings include what a prior art reference teaches, whether a reference provides a motivation to combine its teachings with others, see *In re Beattie*, 974 F.2d 1309, 1311, 24 U.S.P.Q.2D (BNA) 1040, 1041-42 (Fed. Cir. 1992), whether the invention experienced commercial success, and whether it satisfied a long-felt, but unmet need, see *C.R. Bard, Inc. v. M3*

*Sys., Inc.*, 157 F.3d 1340, 1351, 48 U.S.P.Q.2D (BNA) 1225, 1231 (Fed. Cir. 1998).

In reviewing "a jury special verdict on patent claim obviousness where the underlying facts have been disputed[,] . . . we first presume that the jury resolved the underlying factual disputes in favor of the verdict winner and leave those presumed findings undisturbed if they are supported by substantial evidence. Then we examine the legal conclusion de novo to see whether it is correct in light of the presumed jury fact findings." *Jurgens v. McKasy*, 927 F.2d 1552, 1557, 18 U.S.P.Q.2D (BNA) 1031, 1035 (Fed. Cir. 1991) (citations omitted). The same rule also applies to special interrogatories.

To establish a prima facie case of obviousness, Denso must show "some objective [\*\*13] teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *Fine*, 837 F.2d at [\*\*1360] 1074, 5 U.S.P.Q.2D (BNA) at 1598. There is no suggestion to combine, however, if a reference teaches away from its combination with another source. See *id.* at 1075, 5 U.S.P.Q.2D (BNA) at 1599. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant . . . [or] if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *In re Gurley*, 27 F.3d 551, 553, 31 U.S.P.Q.2D (BNA) 1130, 1131 (Fed. Cir. 1994). If when combined, the references "would produce a seemingly inoperative device," then they teach away from their combination. *In re Sponnoble*, 56 C.C.P.A. 823, 405 F.2d 578, 587, 160 U.S.P.Q. (BNA) 237, 244 (CCPA 1969); see also *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984) [\*\*14] (finding no suggestion to modify a prior art device where the modification would render the device inoperative for its intended purpose).

Denso argues that the court should have granted its motion for judgment as a matter of law because the invention of the claims would have been obvious over U.S. Patent No. 3,136,001 ("the Gelbard patent") in combination with the brass plug method. Although Tec Air disclosed the Gelbard patent to the Patent and Trademark Office during prosecution of the Swin patents, the details of the brass plug method were not before the examiner. The Gelbard patent teaches using adjustable screws to create balance lugs on the blade tips of a molded fan. Unlike the screws of the Swin patents, these screws are accessible from the rear of the mold.

Because, in the brass plug method, the operator drills the brass plugs from the cavity-side of the mold, combining this method with the teachings of the Gelbard patent results in cavity-side accessible screws. The Gelbard patent teaches, however, that each of its adjustable threaded members has "a non-threaded or smooth tip extending into a recess," which comes into contact with the molten plastic. Col. 1, ll. 64-67. This [\*\*15] teaching is consistent with the conventional wisdom as late as 1974, which counseled against arranging screw heads to face the cavity-side of the mold because molten plastic would (1) enter the screw slot, which would be difficult to remove, and (2) likely seep behind the screw head and jam the screw, according to Tec Air's expert, Dr. Williamson. Because the brass plugs-Gelbard patent combination would be inoperable for its intended purpose--no screw driver would be able to turn the smooth-headed screws from the cavity-side of the mold--the jury reasonably could have found that the Gelbard patent taught away from its combination with the brass plug method.

Alternatively, even assuming that Denso established a prima facie case of obviousness, Tec Air presented sufficient objective evidence of nonobviousness to rebut it. "Objective evidence of non-obviousness may be used to rebut a prima facie case of obviousness based on prior art references." *WMS Gaming Inc. v. International Game Tech.*, 184 F.3d 1339, 1359, 51 U.S.P.Q.2D (BNA) 1385, 1400 (Fed. Cir. 1999). This type of evidence "may include commercial success [and] long-felt but unsolved need." *Id.* [\*\*16] "Whether the evidence presented suffices to rebut the prima facie case is part of the ultimate conclusion of obviousness and is therefore a question of law." *In re Rouffet*, 149 F.3d 1350, 1355, 47 U.S.P.Q.2D (BNA) 1453, 1456 (Fed. Cir. 1998).

According to the trial court, Tec Air presented evidence that millions of fans were sold by both Tec Air and Denso and that the patented method eliminated the "tedious, haphazard, and expensive process of drilling the surface of the mold cavity." Based on Tec Air's sales evidence, the jury reasonably could have found that the invention enjoyed commercial success. Denso argues that this evidence [\*\*1361] is insufficient because Tec Air failed to provide market share data. Although sales figures coupled with market data provide stronger evidence of commercial success, sales figures alone are also evidence of commercial success. See *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1027, 226 U.S.P.Q. (BNA) 881, 888 (Fed. Cir. 1985) ("Information [about market share] might bolster the existence in fact of any commercial success . . . demonstrated by [mere sales data] . . ."), overruled on other grounds by *Midwest Indus., Inc. v. Karavan Trailers, Inc.*, 175 F.3d 1356, 1358-61, 50 U.S.P.Q.2D (BNA) 1672, 1674-76



(*Fed. Cir. 1999*) [\*\*17] (en banc); see also *In re Huang*, 100 F.3d 135, 140, 40 U.S.P.Q.2D (BNA) 1685, 1689 (*Fed. Cir. 1996*) ("This court has noted in the past that evidence related solely to the number of units sold provides a very weak showing of commercial success, if any."); see, e.g., *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1579, 42 U.S.P.Q.2D (BNA) 1378, 1384 (*Fed. Cir. 1997*) ("The record contains significant evidence of the commercial success of [the] invention. The record shows that [a competitor] sold over 14,800 dialysis machines allegedly incorporating the [claimed] invention since 1987."); *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1566, 1572, 41 U.S.P.Q.2D (BNA) 1641, 1643, 1648 (*Fed. Cir. 1997*) (affirming a finding that "sales evidence . . . shows [strong commercial] success," where the "sales evidence" consisted solely of the patentee's "\$ 17 million of sales from 1979 through 1984, and its \$ 4 million of annual sales from 1985 through 1989").

Denso also argues that Tec Air failed to show a nexus between the sales and the patented invention. "A prima facie case of nexus is generally made out when the patentee shows [\*\*18] both that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent." *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392, 7 U.S.P.Q.2D (BNA) 1222, 1226 (*Fed. Cir. 1988*). The evidence shows that Tec Air sold approximately two million fans per month, all of which were made according to the patented method. See *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1481, 1 U.S.P.Q.2D (BNA) 1241, 1246 (*Fed. Cir. 1986*) (finding commercial success where a product made by a patented method was commercially successful).

According to the trial court, Tec Air also offered testimony that "there was a long-felt but unmet need to create a more efficient method to achieve fan balance" prior to the Swin patents. Swin, Sr. testified that Tec Air used several unsatisfactory balancing techniques before adopting the patented one. Dr. Williamson testified that the industry experienced problems with the prior art machining methods. Moreover, after Denso ceased infringing the Swin patents, it had to resort to less effective methods of balancing the fans. Based on this evidence, [\*\*19] the jury reasonably could have found there was a long-felt but unmet need in the prior art for an improved balancing method, which the Swin patents satisfied.

In light of this objective evidence of nonobviousness and the lack of evidence of a suggestion to combine the references, the court properly denied Denso's motion for judgment as a matter of law on the obviousness issue.

## Damages

In addition to arguing that the court should have granted its motion for judgment as a matter of law on the damages issue, Denso argues that the court should have granted a new trial on this issue. We review the trial court's denial of a motion for a new trial for abuse of discretion. See *DMI, Inc. v. Deere & Co.*, 802 F.2d 421, 427, 231 U.S.P.Q. (BNA) 276, 280 (*Fed. Cir. 1986*). "That question turns on whether an error occurred in the conduct of the trial that was so grievous as to have rendered the trial unfair." *Id.*

[\*1362] The jury awarded damages based on the entire market value rule, "which permits recovery of damages based on the value of the entire apparatus containing several features, where the patent related feature is the basis for customer demand." *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1580, 12 U.S.P.Q.2D (BNA) 1026, 1031 (*Fed. Cir. 1989*). [\*\*20] The entire market value rule is appropriate where both the patented and unpatented components together are "analogous to components of a single assembly," "parts of a complete machine," or "constitute a functional unit," but not where the unpatented components "have essentially no functional relationship to the patented invention and . . . may have been sold with an infringing device only as a matter of convenience or business advantage." *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1550, 35 U.S.P.Q.2D (BNA) 1065, 1073 (*Fed. Cir. 1995*) (en banc).

Denso argues that the jury could not have reasonably found that (1) the patented and unpatented components comprised a single functional unit and (2) the basis for the customer demand was the method of balancing the fan inside the assembly. Denso's damage expert testified that the motors used with the radiator and condenser assemblies required fans. Denso did not sell these assemblies without fans. Denso's internal documents stress, moreover, that the performance and price of the entire system were paramount to its customers. This evidence amply supports the finding that the assemblies were a single functional unit. In addition, [\*\*21] the evidence shows that customers wanted fans that were balanced to a certain specification and once Denso abandoned the patented method, it could not meet the 2.0 gm-cm balance specification. Denso argues that its customers did not care how the fans in the assemblies were balanced. However, after Denso changed its specification, one customer complained and required Denso to rebalance the fans. From this evidence, the jury could have reasonably concluded that the demand for the entire assembly depended on the patented invention.

Thus, the jury properly applied the entire market value rule and Denso failed to demonstrate that the trial

192 F.3d 1353, \*, 1999 U.S. App. LEXIS 24276, \*\*;  
52 U.S.P.Q.2D (BNA) 1294

court legally erred in denying its motion for judgment as a matter of law or abused its discretion in declining to grant a new trial on the damages issue.

Conclusion

Accordingly, the judgment of United States District Court for the Northern District of Illinois is affirmed.

AFFIRMED



LEXSEE 103 F3D 1538

**MICRO CHEMICAL, INC, Plaintiff-Appellant, v. GREAT PLAINS CHEMICAL CO., INC., LEXTRON, INC., and ROBERT C. HUMMEL, Defendants-Cross/Appellants, and WILLIAM PRATT, Defendant.**

95-1504, 95-1514

**UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

*103 F.3d 1538; 1997 U.S. App. LEXIS 82; 41 U.S.P.Q.2D (BNA) 1238*

**January 3, 1997, DECIDED**

**SUBSEQUENT HISTORY:** **[\*\*1]** Rehearing Denied March 3, 1997, Reported at: *1997 U.S. App. LEXIS 5018*. Certiorari Denied June 27, 1997, Reported at: *1997 U.S. LEXIS 4112*.

**PRIOR HISTORY:** Appealed from: U.S. District Court for the District of Colorado. Judge Weinshienk.

**DISPOSITION:** AFFIRMED-IN-PART, REVERSED-IN-PART, AND REMANDED

**LexisNexis (TM) HEADNOTES - Core Concepts:**

**COUNSEL:** Timothy B. Dyk, Jones, Day, Reavis & Pogue, of Washington, D.C., argued for plaintiff-appellant. With him on the brief were John P. Pinkerton, Ross Spencer Garsson, and Carl F. Schwenker, of Dallas, Texas, and Gregory A. Castanias, of Washington, D.C. Of counsel on the brief was John Mozola, Sprouse, Mozola, Smith & Rowley, P.C., of Amarillo, Texas.

Dennis J. Mondolino, Hopgood, Calimafde, Kalil & Judlowe, of New York, New York, argued for defendants-cross/appellants. With him on the brief were Michael F. Hurley and Edward M. Reisner.

**JUDGES:** Before ARCHER, Chief Judge, MAYER and LOURIE, Circuit Judges. Opinion for the court filed by Circuit Judge LOURIE. Dissenting opinion filed by Circuit Judge MAYER.

**OPINIONBY:** LOURIE

**OPINION:** **[\*1540]** LOURIE, Circuit Judge.

Micro Chemical Inc. appeals from the judgment of the United States District Court for the District of Colorado that U.S. Patent 4,733,971 is invalid and was not infringed by the defendants. *Micro Chem. Inc. v. Great Plains Chem. Co.*, 900 F. Supp. 1386 (D. Colo. 1995). Great Plains Chemical **[\*\*2]** Co., Inc., Lextron, Inc., and Robert C. Hummel (collectively "Lextron") appeal from the district court's judgment that the patent was not obtained by means of inequitable conduct. *Id.* Because the district court erred in concluding that the patent is invalid, but did not err in concluding that certain of the asserted claims were not infringed and that the patent was not obtained by means of inequitable conduct, we affirm-in-part and reverse-in-part. We remand for a determination of infringement of certain asserted claims not addressed by the district court.

#### BACKGROUND

The '971 patent concerns a method and apparatus for adding small amounts of ingredients ("microingredients") to livestock or poultry feed in order to promote growth and to prevent sickness. Figure 4 of the patent is a front view of the internal parts of the machine (10). The microingredients are stored in bins (68, 74), below which is a weighing hopper (122) supported by a "weigh frame" (34). A mixing vessel (170) is located beneath the weighing hopper and is supported by a separate main frame (46). The machine is controlled by a "weigh microcomputer" and a machine sequencing microcomputer. The patent discloses a **[\*\*3]** block diagram for the computer components and flow charts illustrating software for controlling the operation of the computers and the machine. An operator programs the desired types and amounts of microingredients into

the machine, and the computers control the machine in order to weigh microingredients in the weighing hopper, dispense them into the mixing tank, and mix them with a liquid carrier such as water in order to form a slurry to be sprayed onto the feed. [\*1541]

The machine includes elements for isolating the sensitive equipment of the weighing mechanism from the adverse effects of vibrations or other disturbances that might affect its accuracy. These include isolation pads (44) that dampen vibrations transmitted to the "weigh frame" from the floor on which it is placed. The separate "weigh frame" (34) isolates the weighing equipment from the mixing equipment and other components, which are supported by their own frame (46). The mixing equipment generates substantial vibrations caused by agitation during the mixing process, and use of a separate frame reduces the transfer of those vibrations to the weighing system. An antisway bar (276) dampens transverse motion. The machine is [\*\*4] enclosed by panels (12), which shield its components from dust and other contaminants and also protect the weighing system from external forces such as wind or other jarring contact that may affect its accuracy. The panels (12) are shown in Figure 1 of the patent. According to the specification of the patent, the isolation of the weighing equipment results in consistently accurate weighing of microingredients. [\*1542]

Claim 1, which recites the isolation feature, reads as follows:

1. An apparatus for measuring, dispensing, and delivering microingredient feed additive concentrates in small but accurate amounts in a liquid carrier slurry into a livestock or poultry feed ration shortly before the delivery of said feed ration to the animals for consumption, said apparatus comprising:

multiple storage means for storing separately a plurality of different microingredient feed additive concentrates;

multiple dispensing means for dispensing separately several additive concentrates from said multiple storage means;

weighing means for determining the weights of said different additive concentrates dispensed;

isolating means for isolating said weighing means from influences affecting

[\*\*5] the weighing function of said weighing means so accurate weight determinations are obtained;

control means for controlling separately the operation of said plural dispensing means in response to weight determinations of said weighing means to control the weight of additive concentrates dispensed;

receiving means for receiving additive concentrates dispensed from said storage means;

mixing means for mixing a liquid carrier with the additive concentrates dispensed into said receiving means to form a slurry of said carrier and the dispensed additive concentrates; and delivery means for delivering said slurry to a slurry-receiving station for mixing with a feed ration.

The patent also discloses and claims a method of delivering microingredients using sequential and cumulative weighing. During sequential weighing, the weighing hopper is inverted in order to dump each weighed microingredient into the mixing tank and it is then reverted to receive and weigh the next microingredient. During cumulative weighing, microingredients are repeatedly dumped on top of one another in the weighing hopper as a computer resets a scale to zero after each microingredient is added to the weighing [\*\*6] hopper. Claim 47, which includes the sequential and cumulative weighing feature, reads as follows:

47. A method of dispensing and delivering microingredient feed additives into a livestock feed ration shortly before delivering [\*1543] the feed ration to the livestock for consumption, comprising the steps:

storing separately multiple said additives in concentrate form;

dispensing predetermined weights of selected said additive concentrates into a liquid carrier with no substantial intermixing of the additive concentrates before they enter the liquid carrier;

intermixing the additive concentrates in the liquid carrier to dilute, disperse, and

suspend them and form a liquid carrier-additive slurry;

directing the slurry to a receiving station while maintaining the suspension and dispersion of the additives until delivered into a feed ration; and determining the predetermined weights of selected additives by weighing each additive sequentially and cumulatively in a common weighing container while maintaining separation of the different concentrates in said container.

The development of the '971 invention began in 1984 when the inventor, William C. Pratt, conceived [\*\*7] the idea of a weighing and delivery system having improved accuracy compared to prior art systems. In December 1984, before the critical date of February 26, 1985, n1 Pratt offered to sell a weighing machine to Lee Isaac, manager of the Sunbelt feedlot located in Hugoton, Kansas. Isaac rejected his offer and instead purchased a machine sold by Lextron. Although Pratt had built and tested a weighing system for the machine allegedly offered at that time, he had not constructed a slurry or mixing system for use with the weighing system. He did have a "rough" sketch of the mixing system.

n1 The '971 patent has a filing date of February 26, 1986 and therefore a critical date of February 26, 1985 for purposes of 35 U.S.C. § 102(b).

In January 1985 Pratt constructed a prototype that included both the weighing and the mixing systems. He encountered several problems during testing of this prototype. His primary challenge was in isolating the weighing system from the adverse effects of vibrations caused by the mixing [\*\*8] system and by other sources. Because of its sensitivity, the weighing system was liable to provide incorrect measurements as a result of these vibrations. Pratt constructed another prototype in February 1985, but it also did not accurately weigh microingredients consistently. In late February he incorporated additional elements into that prototype in order to achieve adequate isolation of the weighing system. The improved February prototype contained as isolating elements a separate "weigh frame," rubber isolation pads, and longitudinal and lateral stabilizers. He also added a three-speed mixer to the mixing tank to intermix the microingredients with a liquid carrier and he used two RCA computers for controlling operation of the machine. It produced satisfactory results when tested and

it was presented to a group of Tulsa bankers on February 28, 1985, after the critical date.

Three days after the patent issued, Micro sued Lextron, Great Plains Chemical Co., Inc., and Robert C. Hummel n2 for infringement. n3 Micro alleged that Lextron infringed the patent by manufacturing and selling microingredient additive machines referred to as "cumulative weigh" and "weigh/dump" machines. Micro [\*\*9] also alleged that Lextron induced infringement by providing what it referred to as "no-mix" machines to feedlots owned by Cactus Feeders. Lextron counterclaimed for a declaratory judgment of invalidity and noninfringement. n4 In March 1993, the district court conducted a bench trial of all patent-related issues, having separated out the damages issues.

n2 Great Plains Chemical Co., Inc. is Lextron's predecessor company. Robert C. Hummel is the president of Lextron.

n3 Micro asserted infringement of claims 1, 3, 9, 11, 13, 45, 47, 48, 49, 63, 65, 67, 68, 74, 79, 89, 90, 91, 92, 93, and 94.

n4 Lextron counterclaimed against both Micro and its president, Pratt.

The district court held that the asserted claims of the patent were invalid under section 102(b), determining that the December 1984 offer to Isaac triggered the on-sale bar. n5 [\*1544] The district court held that all the claims of the '971 patent were also invalid under section 103, concluding that the invention would have been obvious to one skilled [\*\*10] in the art based on a combination of the features of two prior art microingredient machines. It concluded that Lextron did not directly infringe claims 1, 3, 9, 11, 13, and 45, and did not induce infringement of claims 1, 3, 45, 63, 74, 93, and 94. The district court did not address infringement of the other asserted claims. It also held that Pratt and his representative, James S. Leigh, did not engage in inequitable conduct in the procurement of the patent. Accordingly, the district court entered judgment for Lextron on Micro's complaint and on Lextron's counterclaim for a declaratory judgment of invalidity and noninfringement.

n5 "A person shall be entitled to a patent unless . . . the invention was . . . on sale in this country, more than one year prior to the date of the application for patent in the United States . . . ." 35 U.S.C. § 102(b) (1994).

Micro now appeals to this court, challenging the district court's judgment concerning validity and infringement. Lextron cross-appeals, asserting that the district [\*\*11] court erred in concluding that no inequitable conduct occurred.

## DISCUSSION

On appeal from a bench trial, we review a district court's decision for errors of law and clearly erroneous findings of fact. *Fed. R. Civ. P. 52(a)*; see *Interspiro USA, Inc. v. Figgie Int'l Inc.*, 18 F.3d 927, 930, 30 U.S.P.Q.2D (BNA) 1070, 1072 (*Fed. Cir. 1994*).

### A. The On-Sale Bar

Micro argues that there was no sale of, or definite offer to sell, the invention prior to the critical date. It asserts that the invention could not have been on sale at the time of the alleged offer to Isaac because the invention did not exist at that time. According to Micro, as of the December date, Pratt had not yet designed anything patentable and the public therefore could not be in possession of his invention.

Lextron responds that the offer to Isaac in December 1984 was properly found to constitute an on-sale bar. According to Lextron, Pratt did have an invention to sell to Isaac at that time, insisting that Pratt had already built three prototypes and had reduced the invention to practice approximately two weeks after the offer was made. Furthermore, Lextron argues that, according to our decision in *UMC Elecs. [\*\*12] Co. v. United States*, 816 F.2d 647, 2 U.S.P.Q.2D (BNA) 1465 (*Fed. Cir. 1987*), cert. denied, 484 U.S. 1025, 98 L. Ed. 2d 761, 108 S. Ct. 748 (1988), a prior reduction to practice is not a prerequisite to an on-sale bar and that even before the reduction to practice had occurred, the offer to Isaac constituted a bar.

Application of the on-sale bar under section 102 is a question of law based upon underlying issues of fact. See *KeyStone Retaining Wall Sys., Inc. v. Westrock, Inc.*, 997 F.2d 1444, 1451, 27 U.S.P.Q.2D (BNA) 1297, 1303 (*Fed. Cir. 1993*); *UMC*, 816 F.2d at 657, 2 U.S.P.Q.2D (BNA) at 1472. A determination that an invention was on sale within the meaning of section 102(b) requires that "the claimed invention asserted to be on sale was operable, the complete invention claimed was embodied in or obvious in view of the device offered for sale, and the sale or offer was primarily for profit rather than for experimental purposes." *Keystone*, 997 F.2d at 1451, 27 U.S.P.Q.2D (BNA) at 1303. In *UMC*, we stated that a reduction to practice of the claimed invention is not a prerequisite for triggering the on-sale bar. *UMC*, 816 F.2d at 656, 2 U.S.P.Q.2D (BNA) at 1471. Rather, "all of the circumstances surrounding the sale or offer to sell,

including [\*\*13] the stage of development of the invention and the nature of the invention, must be considered and weighed against the policies underlying section 102(b)." *Id.*, 2 U.S.P.Q.2D (BNA) at 1471-72.

We agree with Micro that the invention of the patent was not offered for sale before the critical date within the meaning of section 102(b). The evidence compels a conclusion that Pratt's invention was clearly not completed when he made the December offer. At the time of the alleged offer, Pratt had developed a prototype for the weighing system; however, he had only made a sketch [\*1545] of the mixing system and had not yet designed the elements for isolating the weighing system. The invention was thus not close to completion and Pratt was not confident at that time that the invention would work for its intended purpose. Pratt testified that, as of December 28, 1984, "there had been no construction of the mixing tank or the slurry system portion of the machine at that time." He stated that what he had at that time was a proposed configuration. At the time of the alleged offer to Isaac, Pratt had not reduced the invention to practice, nor had he substantially completed the invention. Because Pratt was not [\*\*14] close to completion of the invention at the time of the alleged offer and had not demonstrated a high likelihood that the invention would work for its intended purpose upon completion, his December 1984 "offer" could not trigger the on-sale bar.

In the *UMC* case, we held a patent invalid on the basis of an on-sale bar, even though the invention had not been reduced to practice. Although Lextron argues here that *UMC* requires that we affirm the invalidity of Micro's patent, we do not agree. The invention in *UMC* was an aviation counting accelerometer ("ACA"), which was used in aircraft for sensing and determining how many times the aircraft had been subjected to predetermined levels of acceleration. ACAs had previously used electro-mechanical sensors, which generated a mechanical signal to indicate levels of acceleration, and at times produced an erroneous signal as a result of mechanical vibrations or stresses. The new ACA used an analog transducer, which produced an electrical signal that could be filtered to remove the adverse effects of mechanical vibrations. *UMC* made a definite offer to sell the new ACA before the critical date of the patent-in-suit. At the time of [\*\*15] the offer, the new ACA was substantially complete. The court stated that the "prior art devices embodied each element of the claimed invention, save one, and that portion was available and had been sufficiently tested to demonstrate to the satisfaction of the inventor that the invention as ultimately claimed would work for its intended purpose." *UMC*, 816 F.2d at 657, 2 U.S.P.Q.2D (BNA) at 1472.

The invention was substantially completed and there was reason for a high degree of confidence that it would work for its intended purpose. See *Seal-Flex, Inc. v. Athletic Track and Court Constr.*, 98 F.3d 1318, 1322, 40 U.S.P.Q.2D (BNA) 1450, 1452 (Fed. Cir. 1996).

UMC thus stands for the proposition that, even though the technical requirements of a reduction to practice have not been met, a sale or a definite offer to sell a substantially completed invention, with reason to expect that it would work for its intended purpose upon completion, suffices to generate a statutory bar. On the other hand, the court stated that "if the inventor had merely a conception or was working towards development of that conception, it can be said there is not yet any 'invention' which could be placed on sale." [\*\*16] *UMC*, 816 F.2d at 657, 2 U.S.P.Q.2D (BNA) at 1472. The facts here fit the UMC opinion's hypothetical statement of facts which would fail to constitute a bar much more closely than they fit the actual facts in that case which the court found constituted a bar. We conclude that the undisputed facts concerning Pratt's alleged offer to sell do not constitute an on-sale bar within the meaning of 35 U.S.C. § 102(b) and that the district court erred in holding that they did.

#### B. Obviousness

Micro argues that the district court erred in concluding that the invention of the asserted claims would have been obvious at the time it was made to one skilled in the relevant art. According to Micro, the court erred by combining elements in the prior art without any teaching or suggestion to do so. Lextron responds that the district court correctly applied the law on obviousness.

A determination of obviousness under 35 U.S.C. § 103 is a legal conclusion involving factual inquiries. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050, 5 U.S.P.Q.2D (BNA) 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825, 102 L. Ed. 2d 51, 109 S. Ct. 75 (1988). The district court held that the invention of the patent would have been obvious [\*\*17] at the time it was made based upon the combination of a prior art weighing machine and prior art volume machines. The prior [\*\*1546] art weighing machine was designed by Sherman Brewster and is referred to as "the Brewster machine." It weighed and dispensed the microingredients sequentially, but had no system for positive intermixing of microingredients with a liquid carrier. When Brewster's customers wanted to use a liquid carrier, the machine would dump the microingredients into a tub of water, which would then be flushed and pumped into a truck containing feed; any mixing occurred only incidentally. The relevant prior art volume machines

were manufactured by Lextron. They operated by dispensing microingredients into a mixing tank partially filled with water. The machines included a motor-driven propeller shaft in the mixing tank for mixing the microingredients and the water carrier in order to form a homogenous slurry.

The district court found that one skilled in the art would have been aware of the Brewster weighing machine and that it would have been obvious to combine the features of that machine with those of the volume machines in order to obtain more accurate dispensing of feed [\*\*18] additives. The court thus combined the weighing feature of the Brewster machine with the mixing feature of the volume machines, the motivation to combine apparently arising from the knowledge of those skilled in the art of the need for more accurate dispensing of microingredients.

Micro argues, however, that there was no motivation to combine the Brewster weighing machine with the mixers of the volume machine, because the latter produced vibrations that would adversely affect the Brewster machine's sensitive weighing equipment. According to Micro, the Brewster machine failed to adequately isolate the weighing mechanism from vibrations or other motions and consequently performed inaccurately. Lextron responds that the Brewster machine contained an accurate weighing mechanism, as evidenced by the testimony of Brewster's customers who operated feedlots using the machine, and that by having a separate frame for its slurry delivery system, it would not have the accuracy and isolation difficulties Pratt's invention avoids.

We agree with Micro that the claimed invention would not have been obvious in view of the Brewster weighing machine and the Lextron volume machines. A determination [\*\*19] of obviousness must involve more than indiscriminately combining prior art; a motivation or suggestion to combine must exist. *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 U.S.P.Q. (BNA) 929, 933 (Fed. Cir. 1984). As we recently stated:

Such a suggestion may come expressly from the references themselves. See, e.g., *In re Sernaker*, 702 F.2d 989, 994, 217 U.S.P.Q. (BNA) 1, 5 (Fed. Cir. 1983). It may come from knowledge of those skilled in the art that certain references, or disclosures in the references, are known to be of special interest or importance in the particular field. Cf. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n.24, 227 U.S.P.Q. (BNA)

657, 667 n.24 (*Fed. Cir.* 1985) (stating that the knowledge of one skilled in the art may provide the "teaching, suggestion, or inference" to combine references), cert. denied, 475 U.S. 1017, 89 L. Ed. 2d 315, 106 S. Ct. 1201 (1986). It may also come from the nature of a problem to be solved, leading inventors to look to references relating to possible solutions to that problem. See, e.g., *In re Rinehart*, 531 F.2d 1048, 1054, 189 U.S.P.Q. (BNA) 143, 149 (CCPA 1976) (considering the problem to be solved in a determination of obviousness).

[\*\*20]

*Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 U.S.P.Q.2D (BNA) 1626, 1630 (*Fed. Cir.* 1996). Here, the record contains no evidence of a motivation or suggestion to combine the Brewster weighing machine with the Lextron volume machines. In fact, one skilled in the art would not have been motivated to combine the Brewster machine with the volume machines, because the vigorous motion of the mixing elements in the volume machines would have been expected to cause inaccurate weighing. The prior art therefore led away from the idea of combining the features of Brewster with the features of the volume machines. Pratt's invention solved the problem by going against the prior art and successfully combining accurate weighing with accurate delivery of microingredients. Pratt was able to [\*1547] combine the features of weighing and positive intermixing only because he added isolation means to achieve consistently accurate weighing in an environment subject to vibrations from mixing equipment.

Pratt's extensive efforts to solve the problem of isolating the weighing system indicate the absence of a suggestion to combine the Brewster machine with the positive intermixing [\*\*21] elements of the volume machines. See *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2D (BNA) 1529, 1532 (*Fed. Cir.* 1988) (stating that the "five to six years of research that preceded the claimed invention" was entitled to fair evidentiary weight in a determination of nonobviousness). These efforts by Pratt tend to show that one skilled in the art would have had no reasonable expectation of success in combining the prior art machines in question. See *id.*, 5 U.S.P.Q.2D (BNA) at 1531 ("The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art."). Long-felt need in the face of prior art

later asserted to lead to a solution tends to negate the proposition that the combination of such prior art would have been obvious. We therefore conclude that the district court erred in holding the subject matter of the disputed claims to have been obvious.

### C. Direct Infringement

Micro argues that the district court erred in its construction of the isolating means of the claims. Lextron responds [\*\*22] that the district court properly found that the accused device did not contain a structure equivalent to the isolating means. Specifically, Lextron states that its accused machines achieved isolation by using a rigid mainframe rather than rubber base plates, silicon sealants rather than a separate "weigh frame," and compression mounting of the weighing hopper rather than antistatic bars.

Determining whether a patent claim has been infringed requires a two-step analysis: "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." *Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.*, 15 F.3d 1573, 1576, 27 U.S.P.Q.2D (BNA) 1836, 1839 (*Fed. Cir.* 1993). Claim construction is a question of law, which we review de novo. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979, 34 U.S.P.Q.2D (BNA) 1321, 1329 (*Fed. Cir.* 1995) (in banc), *aff'd*, 134 L. Ed. 2d 577, 116 S. Ct. 1384, 38 U.S.P.Q.2D (BNA) 1461 (1996). The application of a properly construed claim to an accused device is a question of fact, which we review for clear error. *General Am. Transp. Corp. v. Cryo-Trans, Inc.*, 93 F.3d 766, 769, 39 U.S.P.Q.2D (BNA) 1801, [\*\*23] 1803 (*Fed. Cir.* 1996).

The district court held that the patent was not literally infringed. In particular, it found that the accused machine did not contain the isolating means required by the asserted claims 1, 3, 9, 11, 13, and 45. The court failed to address whether the remaining asserted claims were infringed.

We agree with the district court that the accused device did not use structure corresponding to the isolating means of asserted claims 1, 3, 9, 11, 13, and 45. Literal infringement of a claim containing a means clause requires that the accused device perform the identical function as that identified in the means clause and do so with structure which is the same as or equivalent to that disclosed in the specification. *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1042, 25 U.S.P.Q.2D (BNA) 1451, 1454 (*Fed. Cir.* 1993). The patent discloses three primary structures for achieving isolation of the weighing system: rubber base plates, a



"weigh frame" separate from the main frame, and an antisway bar attached to the weighing hopper for dampening transverse motions. In comparison, the accused device isolates its weighing system by using a rigid mainframe rather than rubber [\*\*24] base plates, silicon sealants rather than a separate "weigh frame," and compression mounting of the weighing hopper rather than antisway bars. The district court found the structures in question to be significantly different, i.e., structurally nonequivalent, and we conclude that its fact-finding was not clearly erroneous.

[\*1548] Micro argues that the patent disclosed other structures for achieving isolation that were present in the accused device. In particular, Micro asserts that the patent disclosed, and the accused device contained, protective panels, electrical conduits, and rubber isolation pads. We do not agree that these structures meet the claims. First, it is not clear from the record that the protective panels in the accused device performed the function of isolation. A Lextron witness testified that when he observed accused machines with their side panels removed, the machines did not appear to be affected, that air movement did not affect the hopper. Isolation was apparently not the function of the side panels. It has thus not been established that the protective panels in the accused device performed the function set forth in the claims. Likewise, the testimony cited by [\*\*25] Micro as establishing that the accused device contained electrical conduits and rubber isolation pads fails to identify the function of those elements and thus fails to establish identical functionality. See *id.*, 25 U.S.P.Q.2D (BNA) at 1454 (stating that for a means limitation to read on an accused device it must perform the identical function as specified in the claims).

Micro also argues that the district court made errors of law in its infringement analysis. It cites the district court's statement that the "accused structures in the Lextron weigh machines were also all present, save one, in the Lextron prior art volume machines." Inventions are often a new combination of prior art elements, and thus the fact that particular elements of a claim are present both in the prior art and in an accused device does not negate infringement of a claim consisting of a combination of elements. However, even if the district court's reasoning was in error, as argued by Micro, it does not change the outcome of our review of the infringement determination, as we conclude that the district court's findings concerning infringement were not clearly erroneous. Accordingly, the district court's statement, [\*\*26] even if construed as Micro argues, was harmless error. See *Fed. R. Civ. P.* 61.

Micro argues that the district court erred in requiring equivalents for all three primary disclosed structures in order to meet the isolating means limitation. According

to Micro, the disclosed structures are alternatives; therefore an equivalent to any one of the structures is sufficient to meet the claim limitation. The district court analyzed all three accused structures, finding that none of them was equivalent to those disclosed in the patent. In particular, the district court stated, with our emphasis added, that "none of these structures, either alone or in combination, can properly be considered 'equivalent' under § 112(6)." The court thus found that the accused machines failed to contain an equivalent to any of the disclosed structures. It did not clearly err in its conclusion of lack of infringement.

Micro also argues that the court erred in failing to make infringement findings regarding the remaining asserted claims, consisting of claims 47, 48, 49, 63, 65, 67, 68, 74, 79, 89, 90, 91, 92, 93, and 94. We agree. Without findings of fact and conclusions of law, we are unable to review [\*\*27] the issue of infringement of those claims. See *Fed. R. Civ. P.* 52(a) ("In all actions tried upon the facts without a jury . . . the court shall find the facts specially and state separately its conclusions of law thereon . . .") (emphasis added). Therefore, we must remand for determination of infringement of the remaining asserted claims. We note that not all of the asserted claims include the isolating means limitation. In particular, some of them are method claims which include an isolating step rather than an isolating means (see 35 U.S.C. § 112, para. 6). Other asserted claims define a sequential and cumulative weighing feature and lack either an isolating means or step. Upon remand, the district court should determine whether the remaining asserted claims were infringed.

#### D. Inducement to Infringe

Micro argues that the district court clearly erred in finding no inducement to infringe the asserted claims. Specifically, it argues that the district court incorrectly found that the Cactus Feeders machine did not infringe the claims because its use of molasses failed to meet the liquid carrier limitation of the claims in question. In support of its argument, [\*\*28] [\*1549] Micro states that U.S. Patent 3,437,075 ("the Hawes patent"), cited in the '971 patent, identifies molasses as a liquid carrier. Lextron responds that the district court correctly found no direct infringement and hence no inducement to infringe because molasses is not a liquid carrier as used with the accused machines.

There can be no inducement to infringe absent direct infringement. *Met-Coil Sys. Corp. v. Korners Unlimited, Inc.*, 803 F.2d 684, 231 U.S.P.Q. (BNA) 474, 476 (*Fed. Cir.* 1986). The district court did not clearly err in its finding that molasses failed to meet the liquid carrier limitation of the claims in question. The record supports

the conclusion that molasses, when used as a liquid microingredient, was not a liquid carrier. The Hawes patent, which was part of the relevant prior art, refers to molasses as a liquid microingredient, rather than a liquid carrier. Thus, the district court did not clearly err in finding that the Cactus Feeder's machines combined microingredients with liquid microingredients, rather than mixing microingredients with a liquid carrier, as required by the claims.

#### E. Inequitable Conduct

In its cross-appeal, Lextron argues that Pratt [\*\*29] and Leigh engaged in inequitable conduct in three ways. According to Lextron, they deliberately misled the examiner concerning the state of the Brewster machine, intentionally failed to inform the U.S. Patent and Trademark Office ("PTO") of their knowledge concerning the prior art Lextron volume machine, and intentionally and falsely described the need for accuracy in delivering microingredients. Micro responds that there was no evidence of intent to mislead the examiner and that the volume machine was cumulative prior art and hence not material.

A determination of inequitable conduct is committed to a district court's discretion. Accordingly, we review the court's judgment for abuse of discretion. *Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 876, 9 U.S.P.Q.2D (BNA) 1384, 1392 (Fed. Cir. 1988), cert. denied, 490 U.S. 1067, 104 L. Ed. 2d 633, 109 S. Ct. 2068 (1989). To overturn a discretionary ruling of a district court, "the appellant must establish that the ruling is based on clearly erroneous findings of fact or on a misapplication or misinterpretation of applicable law, or evidences a clear error of judgment on the part of the district court." *Molins PLC v. Textron, Inc.*, 48 F.3d 1172, 1178, [\*\*30] 33 U.S.P.Q.2D (BNA) 1823, 1827 (Fed. Cir. 1995).

Inequitable conduct consists of an "affirmative misrepresentation of a material fact, failure to disclose material information, or submission of false material information, coupled with an intent to deceive." *Id.*, 33 U.S.P.Q.2D (BNA) at 1826. One alleging inequitable conduct must prove the threshold elements of materiality and intent by clear and convincing evidence. *Id.*, 33 U.S.P.Q.2D (BNA) at 1826-27. The district court must then weigh the threshold findings of materiality and intent in light of all the circumstances to determine whether they warrant a conclusion that inequitable conduct occurred. *Id.*

The district court held that Micro's representatives did not engage in inequitable conduct in the prosecution of the '971 patent. The court found that Leigh and Pratt

did not intend to mislead the PTO through their statements characterizing the Brewster machine and that the Lextron volume machine was cumulative prior art and hence not material; thus Leigh and Pratt did not intend to mislead the PTO through their failure to cite it. The court did not make specific findings with respect to the statements about the need for accuracy in delivering microingredients. [\*\*31] In spite of its holding that no inequitable conduct occurred, the district court held that the patent is unenforceable, apparently based upon its invalidity holding.

Lextron argues that Micro's representatives deliberately misled the PTO concerning the qualities of the Brewster weighing machine. According to Lextron, the subjective statements in the '971 patent concerning the Brewster machine were intentionally drafted to be misleading. The following are the statements in question:

It is believed that at least one weigh-type additive concentrate delivery system has been tried, but unsuccessfully. It is believed [\*\*1550] that such system weighed and then dispensed each additive separately and sequentially. It is believed that such system was unsuccessful because it was too slow and too inaccurate for handling additive concentrates in a feedlot environment.

'971 patent, col. 2, lines 12-18 (Background of the Invention). Lextron argues that Micro had a duty to verify the facts supporting their statements and that it did not do so. Lextron also cites a statement in an Information Disclosure Statement that Leigh submitted to the PTO. In describing the Brewster machine, he stated [\*\*32] that "from applicant's inspection it appears that such machines . . . all lacked means for isolating the weigh components from external influences during weighing and were therefore highly inaccurate."

We agree with the district court that the prosecution history reviewed as a whole fails to evidence an intent to mislead the PTO. In the portion of the patent quoted above, Pratt stated his personal belief, rather than a representation of facts. Furthermore, in another Information Disclosure Statement, Leigh provided a detailed description of the Brewster machine based upon personal inspection. Leigh identified the alleged isolating means of the Brewster machine and provided reasons why they failed to adequately achieve isolation. In particular, Leigh stated in describing the Brewster machine that the "load cell frame was connected by short, stiff rubber straps to the main frame of the apparatus," and he argued that:

(5) The short rubber straps mounting the load cell frame to the main frame of the apparatus appeared to be so stiff that they would not provide any appreciable isolation of the weighing components of the apparatus from the main frame.

(6) Also apparently [\*\*33] contributing to the lack of isolation and an apparent [sic] source of inaccuracy in the weighing would be the metal hydraulic fluid conduit which in effect connects the hydraulic cylinder on the weigh hopper to the main frame because of its stiffness and spring-like action.

Thus, the record evidences suitable disclosure of the alleged isolating elements of the Brewster machine during prosecution of the patent along with proper arguments as to why those elements failed to adequately achieve isolation.

Lextron also argues that Pratt and Leigh intentionally failed to disclose to the PTO their knowledge of a Lextron volume machine, which it asserts was material prior art. According to Lextron, they were aware of the Lextron machine because of their participation in previous litigation involving that machine. Micro responds that the machine was cumulative prior art and hence not material.

The district court did not clearly err in determining that the Lextron volume machine was cumulative and hence not material. The district court found that the Lextron machine was cumulative to the Hawes patent and U.S. Patent 3,720,185 ("Aldous patent"), both of which were disclosed to [\*\*34] the PTO. The district court found that the Aldous patent disclosed a mechanical mixer. It also found that the relevant limitations of the claims included "flow-inducing means," "intermixing," and "positive intermixing," and that the Hawes patent disclosed these elements. Lextron has not established that those conclusions were clearly erroneous. The relevant mixing elements of the Lextron volume machine were thus cumulative and not material.

Lextron further argues that Pratt and Leigh intentionally and falsely described the need for accuracy. According to Lextron, they falsely stated that accuracy must often be within half a gram, considering that government regulations allow for a thirty-five percent margin of error. Micro responds that Pratt and Leigh did not falsely describe the need for accuracy in dispensing microingredients, considering, for example, the industry literature cited in the '971 patent file history describing the need for accuracy in measuring microingredients.

The record contains evidence of industry literature describing the need for accuracy. Moreover, the prior art Hawes patent stated that improved accuracy allowed the use of highly toxic additives without [\*\*35] risk of overdose. Pratt and Leigh reasonably could have relied upon that literature as establishing [\*1551] a belief in a need for accuracy within the relevant industry, thereby negating intent to deceive the PTO. Accordingly, the district court did not abuse its discretion in determining that Pratt and Leigh did not engage in inequitable conduct in the procurement of the '971 patent.

We have considered the parties' other arguments and conclude that they are either unpersuasive or unnecessary for resolution of this appeal.

### CONCLUSION

The district court erred in holding that the '971 patent was invalid, but did not err in holding that Lextron did not infringe certain of the asserted claims and that the patent was not obtained through inequitable conduct. We therefore reverse the district court's judgment that the asserted claims are invalid under section 102(b), that the patent is invalid under section 103, and that the patent is unenforceable, and we otherwise affirm its judgment. We remand for a determination of infringement of the asserted claims not treated by the district court's opinion and, if necessary, damages.

### COSTS

Each party shall bear its own costs.

AFFIRMED-IN-PART, REVERSED-IN-PART,  
[\*\*36] AND REMANDED

### DISSENTBY: MAYER

DISSENT: MAYER, Circuit Judge, dissenting.

Because proper deference to the district court's findings of fact about the on sale bar compels the conclusion that Micro Chemical, Inc.'s patent is invalid, I dissent.

An inventor loses his right to a patent if he placed his invention "in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States." 35 U.S.C. § 102(b) (1994). To invalidate a patent under this section, the party asserting the on sale bar must demonstrate by clear and convincing evidence "that there was a definite sale or offer to sell more than one year before the application for the subject patent, and that the subject matter of the sale or offer to sell fully anticipated the claimed invention or would have rendered the claimed invention obvious by

its addition to the prior art." *UMC Elec. Co. v. United States*, 816 F.2d 647, 656, 2 U.S.P.Q.2D (BNA) 1465, 1472 (Fed. Cir. 1987). Once a party asserting the bar proves the existence of an offer and either identity between the offered and patented apparatus or obviousness of the claimed invention in light of the offered apparatus and [\*\*37] its teachings, the patent owner can preserve the validity of his patent by "coming forward with evidence to counter that showing." *U.S. Envtl. Prods., Inc. v. Westall*, 911 F.2d 713, 716, 15 U.S.P.Q.2D (BNA) 1898, 1901 (Fed. Cir. 1990).

The determination that a product was placed on sale under section 102(b) is a question of law, based on underlying facts. *KeyStone Retaining Wall Sys. Inc. v. Westrock, Inc.*, 997 F.2d 1444, 1451, 27 U.S.P.Q.2D (BNA) 1297, 1303 (Fed. Cir. 1993). While we review the district court's ultimate determination of a section 102(b) bar de novo, we review subsidiary facts supporting this conclusion for clear error. *Ferag AG v. Quipp, Inc.*, 45 F.3d 1562, 1566, 33 U.S.P.Q.2D (BNA) 1512, 1515 (Fed. Cir. 1995); *U.S. Envtl. Prods.*, 911 F.2d at 715, 15 U.S.P.Q.2D (BNA) at 1900.

In reviewing a district court's legal and factual determinations attending section 102(b), this court should resist blurring the distinction between its two separate inquiries, namely the existence of an offer for sale more than one year prior to the critical date, and the sale of subject matter that would fully anticipate or render obvious the claimed invention by its addition to the prior art. A definite [\*\*38] and firm belief that the subject matter of a sale would not anticipate or render obvious the claimed invention does not transform a firm offer into a nebulous or indefinite one.

The district court made a well supported finding that William Pratt made a definite offer to Lee Isaac in 1984, based in part on the following facts:

Mr. Lee Isaac, co-owner of the Sunbelt Feedlot, confirmed that he had several meetings with Mr. Pratt . . . between October, 1984, and the beginning of January, 1985, during which Mr. Pratt offered to place a weigh machine at the Sunbelt Feedlot. Isaac testified that Mr. Pratt had told him "that it [MCI weigh machine] was [\*1552] more accurate than the volume machine." Mr. Isaac also testified that it was his understanding that the machine was . . . ready to be placed at the feedlot as soon as he would place an order.

Mr. Pratt testified that he reviewed these [no longer existing sales] files and created these notes [entitled "Need Patent Filing Date," one of which states "12/26/84 - MWS machine offered in person for 6D e 6L - no date promised. MWS not final version."] after his attorney had explained the need to inform the Patent Office when [\*\*39] the first public use or offer for sale of his patented invention occurred.

The Court is unable to reconcile the plain meaning of the words Mr. Pratt wrote and his purported explanation of what those words signify, particularly when the plain meaning of the words is confirmed by the sworn deposition testimony of a third party witness with no interest in this litigation.

In determining the credibility of Mr. Pratt's explanation of the meaning of the entries on this document, the Court notes that, although this document contains purely factual recitations created by Mr. Pratt for his own use before his patent application was filed, and was never sent to Mr. Pratt's attorney, the document was withheld during discovery on the basis of the attorney work product doctrine, and was misdescribed on plaintiff's privileged document list.

As the district court stated, the lack of discussion about price or payment terms during Pratt's offer to Isaac, although traditionally an indication that no offer was made, is here uninformative because standard practice in the industry was to give these machines to feedlots at no cost to encourage the purchase of microingredient additives - [\*\*40] the primary business of both parties. The fact that Pratt did not describe his apparatus to Isaac beyond saying that it was a weigh machine more accurate than his volume machines, and the fact that Isaac did not understand how the invention worked, are similarly uninformative. In this case, a proper section 102(b) analysis does not focus on the purchaser's knowledge of details about the apparatus or how it works. See, e.g., *RCA Corp. v. Data Gen. Corp.*, 887 F.2d 1056, 1060, 12 U.S.P.Q.2D (BNA) 1449, 1452 (Fed. Cir. 1989) (an offer or sale may invoke the statutory bar "even though no details are disclosed"); *King Instrument Corp. v. Otari Corp.*, 767 F.2d 853, 860, 226 U.S.P.Q. (BNA) 402, 407 (Fed. Cir. 1985) ("When an executory sales contract is entered into (or offered) before the critical date, the purchaser must know

how the invention embodied in the offer will perform. . . . The policies underlying the on sale bar, however, concentrate on the attempt by the inventor to exploit his invention, not whether the potential purchaser was cognizant of the invention. Accordingly, the purchaser need not have actual knowledge of the invention for it to be on sale"). Where the purchaser understands [\*\*41] generally how an apparatus would perform, detailed knowledge is even less determinative. As this court stated in *Ferag*, 45 F.2d at 1568, 33 U.S.P.Q.2D (BNA) at 1516, "We emphasize that this is an objective test, and that at its heart lies the inventor's attempt to commercialize the invention. . . . The measure of the bar is what was offered, not the patentee's intent."

The focus of the dispute below, and the only remaining proper question for our review of the district court's section 102(b) analysis, should be whether the apparatus offered to Isaac in December 1984 embodied or made obvious the patented invention. Our review of the findings of fact and conclusions of law on this question is driven by policy considerations that underlie this section. See *King Instrument*, 767 F.2d at 860, 226 U.S.P.Q. (BNA) at 407. Foremost among these is to prevent inventors from exploiting the commercial value of their inventions beyond the statutory authorization. See *Envirotech Corp. v. Westech Eng'g Inc.*, 904 F.2d 1571, 1574, 15 U.S.P.Q.2D (BNA) 1230, 1232 (Fed. Cir. 1990). To accomplish this, inventors are held to the strict requirement that they file their patent applications no more than one year after an [\*\*42] attempt to commercialize the invention. Thus, we have held that an inventor does not avoid the on sale bar by continuing to add improvements to his invention after its commercialization. See, e.g., *Seal-Flex, Inc. v. Athletic Track and Court Constr.*, 98 F.3d 1318, 1324, 40 U.S.P.Q.2D (BNA) 1450, 1454-55 (Fed. Cir. 1996).

[\*1553] Many factors may influence the determination of an on sale bar within this policy framework. However, because no single factor is controlling, the ultimate determination depends on the totality of the circumstances, that is to say, all of the facts surrounding the transactions, no two of which are alike. *Envirotech*, 904 F.2d at 1574, 15 U.S.P.Q.2D (BNA) at 1232. These individual circumstances require factual determinations about the level of skill and state of the art, the nature of the invention, the stage of its development when offered - including which elements of the later claimed patent were being offered and which would be implicitly suggested by the addition of offered elements to the prior art - and evidence of the inventor's intentions during the alleged commercialization. Although we may reverse a trial court's ultimate conclusion that the totality of evidence [\*\*43] supports a result, we cannot reverse its factual findings themselves, absent a definite and firm

conviction that a mistake has been committed. *Anderson v. City of Bessemer City*, 470 U.S. 564, 573, 84 L. Ed. 2d 518, 105 S. Ct. 1504 (1985).

The district court's findings of fact on the second component of the on sale bar issue are as follows:

[Pratt] had made notes and drawings in December, 1984, illustrating the use of shock absorbing rods and stabilizers on the weigh hopper, flexibly mounting the subframe to prevent vibration transfer and enclosing of the entire machine in panels, to prevent air currents and hopper vibrations from affecting the accuracy of his weigh measurements. Pratt also began constructing his mix tank and slurry delivery system in December.

The January 12 prototype had all of the components of the ingredient mixing and slurry delivery systems that are covered by the "mixing" claims of the patent. Mr. Pratt testified that the January 12 system also cumulatively weighed ingredients, and it is apparent that the January 12 machine contained all of the elements disclosed in the "cumulative" weigh claims. In addition, the January 12 machine contained some isolation means, and Mr. [\*\*44] Pratt's notes indicate that he was already planning the addition of other isolation means such as panels and stabilizer bars. The Court finds that, at the time Mr. Pratt offered his weigh machines to the Sunbelt Feedlot, he had already built one prototype and was engaged in constructing the January 12 prototype.

Although the evidence was disputed below and on appeal, these factual findings are not clearly erroneous, nor has this court so found them.

Relying on these facts, and not just those that are undisputed, the district court formed a legal conclusion that the totality of circumstances manifests the existence of an on sale bar within the meaning of section 102(b). The district court also held that Micro had not countered defendants' showing. While these facts suggest that the apparatus offered on December 26, 1984, was something less than both the reduction to practice that occurred some two weeks later and the final form of the invention as installed in March, our cases as well as the singularly important underlying policy of preventing inventors from extending the patent term each require that we affirm the

existence of an invalidating offer for sale. The addition [\*\*45] of elements improving the invention after the attempted commercialization does not trump the district court's separate factual findings: Pratt attempted to commercially exploit an apparatus by offering it to Isaac in December 1984, and the offered apparatus included either every element claimed in the '971 patent or the necessary suggestion to combine the offered elements with prior art, such as existing isolation means, to render obvious any remaining elements.

Micro's arguments on appeal amount to a request that we reverse the holding of an on sale bar because several features of the patented invention were not fully embodied in, or obvious in light of, the apparatus offered for sale to Isaac in December 1984. n6 Specifically, [\*1554] Micro argues that Pratt had not completed, substantially completed or come close to completing his invention, he was not confident that the invention was "highly likely" to work for its intended purpose, and the invention was not commercially marketable at the time of his offer to Isaac. To support this court's reversal on section 102(b), Micro offers evidence of the development process of Pratt's apparatus, his trial testimony, and requests that we compare [\*\*46] the patent claims to the apparatus that Pratt claims existed at the time of the offer.

n6 The district court stated that Micro failed to direct the court "to elements of the claims not fully embodied in, or obvious in light of, the January 12, 1985" . . . prototype. The relevant inquiry is what was being offered for sale to Isaac, not whether the January 1985 prototype was substantially the same as the claimed invention. However, this error is harmless.

Micro's evidence and arguments were submitted to the district court, which considered and rejected them during a trial of more than two weeks during which it made credibility determinations that are virtually unreviewable by this court. Moreover, Pratt's testimony about his subjective intentions is unhelpful. See, e.g., *TP Lab. v. Professional Positioners, Inc.*, 724 F.2d 965, 972, 220 U.S.P.Q. (BNA) 577, 583 (Fed. Cir. 1984) (in the context of considering objective indicia of experimentation, "the expression by an inventor of his subjective intent . . . particularly [\*\*47] after institution of litigation, is generally of minimal value.") The district court found that Pratt's offer to Isaac added most elements of his '971 patent to the prior art, and this addition rendered obvious all additional elements found in the patent. I see no error. We should refrain from reversing a section 102(b) determination using the secret, subjective and self-interested beliefs of an inventor.